

XX Antitoxin; vaccine; neurotoxin; toxin B; intoxication; immunogen;
KW botulism; BotB.
XX
OS Clostridium botulinum; serotype B strain Eklund 17B.
XX
XX Synthetic.
FH Key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX W09808540-A1.
PN XX
PD 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
PF
XX 28-AUG-1996; 96US-00704159.
PR
XX (OPHI-) OPHIDIAN PHARM INC.
PA
PI Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
DR N-PSDB; AAV30580.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 35; Page 300-302; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (Eklund 17B strain) type B toxin, encoded by a DNA
CC sequence (see AAV30580) in plasmid pHisBotB. This vector was used to
CC express soluble C fragment in Escherichia coli host cells, and the
CC recombinant C fragment was purified on an affinity column. The invention
CC relates to recombinant proteins derived from C. botulinum toxins. Methods
CC are provided which allow for the isolation of soluble recombinant
CC proteins free of significant endotoxin contamination. Preferred hosts for
CC production of recombinant proteins are E. coli, insect cells and yeast
CC cells. The recombinant toxins are used as immunogens for the production
CC of vaccines and antitoxins that are useful in the treatment of humans and
CC animals at risk of intoxication with clostridial toxin
XX
SQ Sequence 472 AA;
AAW68393 Length: 472 August 31, 2004 14:39 Type: P Check: 5316 ..
Found using 'seq23' (hayes346.key)
...
19 GRHMASADTILIEFNKYNSEILNINILNRYDRNNLIDLSGAKVEYDGVKLNKX
|--|
69 72
79 QFKLTSSADSKIRVTQNQNIIFNSMFLDPSVFWIRPKYRNDNDIQNIHNEYTIINCMK
|--|
131
139 NNSGWKISIRGNRIIWLIDINGKTKSVFFEYNIREDISEYINRF
...
189 TNNLDNAKIYINGTLESNMDIKDIGEVINVEITFKLDGVDRTQTFWKKYFIENFTQLN
|--|
239
249 QSNKEIKYIQSYSEVLKDFWGNPLMYNKNFNAGNKNNSYIKLVKDSVGBILIRSKY
|--|
261
279
290
|--|

309 NNSNYINRYNLXIGEXFIIRRESNQSINDDIVRKEDYTHLDLVLHHEWRVYAYKFK
|--| |--| |--|
314 317 347 364
369 EQEKLFLSIISDSNEFYKTIETKEYDEQPSYSCQLLFKKDESDTDDIGLIGHRFYESG
|--|
386
429 VLKKYKDYFCISKWYLKEVRKPYKSNLGCNWQFIPKDEGWTE
|--| |--|
434 437

14 matches found in sequence:
aaw68394; Clostridium botulinum toxin B C fragment.
(from "bc_ags.pep")
TOIG of: aaw68394 check: 3754 from: 1 to: 472
ID AAW68394 standard; protein; 472 AA.
XX
AC AAW68394;
XX
DT 07-DEC-1998 (first entry)
XX
DE Clostridium botulinum toxin B C fragment.
XX
KW Antitoxin; vaccine; neurotoxin; toxin B; intoxication; immunogen;
KW botulism; BotB.
XX
OS Clostridium botulinum; serotype B Danish strain.
OS Synthetic.
XX
FH Key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
FT
XX W09808540-A1.
PN
XX
PD 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
PF
XX 28-AUG-1996; 96US-00704159.
PR
XX (OPHI-) OPHIDIAN PHARM INC.
PA
XX Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
DR N-PSDB; AAV30581.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 35; Page 303-305; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (Danish strain) type B toxin, encoded by a DNA
CC sequence (see AAV30581) in plasmid pETHisB. This vector was used to
CC express soluble C fragment in Escherichia coli host cells, and the
CC recombinant C fragment was purified on an affinity column. The invention
CC relates to recombinant proteins derived from C. botulinum toxins. Methods
CC are provided which allow for the isolation of soluble recombinant
CC proteins free of significant endotoxin contamination. Preferred hosts for
CC production of recombinant proteins are E. coli, insect cells and yeast
CC cells. The recombinant toxins are used as immunogens for the production
CC of vaccines and antitoxins that are useful in the treatment of humans and
CC animals at risk of intoxication with clostridial toxin
XX

```

SQ      Sequence 472 AA;
AAW68394 Length: 472 August 31, 2004 14:39 Type: P Check: 3754
Found using 'seq23' (hayes346.key)
...
19      GRHMASMDTILIEFNKYNSEILNIIILNRYKDNLLDLGSGYAKVEYVDGVELNDKN
      69 72
79      QFKLTSSANSKIRVTQCNLIIFNSVFLDFSVFWIRIPKYKNDGIQNIHNEYTIINCMK
      131
139     NNSGWKISIRGNRIIWTLIDINGTKSVFFPEYNIREDISYINRWF
...
189     TNNLNNAKIYINGKLESNTDIKDIREVIANGELIIFKLDGDIRTQFIWMKYFSIFNTELS
      239
249     QSNIEERYKIQSYGYLKDWFNGPLMVKYEMFNAGNKNYSYIKLKDDSPVGEILTRSKY
      261 279 290
309     NQNSKYNIRDLYIGEKFIIRKNSQSINDDIVRKEDIYIDFFNLNQEWVRVYTKYFK
      314 317 347 349 364
369     KEEKLFLAPISDSEFNNTIQTKEYDEQPTYSCQLLPKDEESTDEIGLGIHRFYESG
      386
429     IVFEYKDYFCISKWYLKEVRKPKYNLKLGCNQWQIPKDEGWTE
      434 437
-----
12 matches found in sequence:
aaw68395 ; Clostridium botulinum toxin E C fragment.
(from "bt_ags.pep")
TOIG of: aaw68395 check: 1515 from: 1 to: 451

ID      AAW68395 standard; protein; 451 AA.
XX
AC      AAW68395;
XX
DT      07-DEC-1998 (first entry)
XX
DE      Clostridium botulinum toxin E C fragment.
XX
KW      Antitoxin; vaccine; neurotoxin; toxin E; intoxication; immunogen;
      botulism; BotE.
XX
OS      Clostridium botulinum; serotype E strain Belgium.
XX
FH      Key
      Location/Qualifiers
FT      Peptide
      1..21
      /note= "N-terminal His tag"
XX
XX      WO9808540-A1.
XX
PD      05-MAR-1998.
XX
PF      28-AUG-1997; 97WO-US015394.
XX

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PR      28-AUG-1996; 96US-00704159.
XX
PA      (OPHI-) OPHIDIAN PHARM INC.
XX
PI      Williams JA, Thalley BS;
XX
DR      WPI; 1998-230234/20.
XX
DR      N-PSDB; AAV30584.
XX
PT      Host cell containing recombinant expression vector encoding Clostridium
      botulinum type B or E toxin - useful to treat humans and other animals at
      risk of intoxication with clostridial toxin.
XX
PS      Example 41; Page 324-325; 428pp; English.
XX
CC      This is the amino acid sequence of the histidine-tagged C fragment of
      Clostridium botulinum (Belgus strain) type E neurotoxin, encoded by a DNA
      sequence (see AAV30584) in plasmid pETHisB. This vector is used to
      express BotE soluble C fragment in Escherichia coli host cells, and the
      recombinant C fragment was purified on an affinity column. The invention
      relates to recombinant proteins derived from C. botulinum toxins,
      especially type B and type E toxins. Methods are provided which allow for
      the isolation of soluble recombinant proteins free of significant
      endotoxin contamination. Preferred hosts for production of recombinant
      proteins are E. coli, insect cells and yeast cells. The recombinant
      toxins are used as immunogens for the production of vaccines and
      antitoxins that are useful in the treatment of humans and animals at risk
      of intoxication with clostridial toxin
XX
SQ      Sequence 451 AA;
AAW68395 Length: 451 August 31, 2004 14:39 Type: P Check: 1515
Found using 'seq23' (hayes346.key)
...
55      MRYKNDKYVDTSGYDSNININGDVVYKPTKNQGIYNDKLSSEVNISQMDYIYDKNYKN
      115 137 105 112
115     FSIQFWWRIPNYDNKIVNVEYTIINCMRDNNSGWKVSLAHNEIITWLQDNGSINGKLA
      137
175     FNYGNANGISDYINKWIFVTITNDRLGDSKLYINGNLIDKKSILNLGNHVSNDNLFKIV
      177
235     NCSYTRVIGIRYFNIFDKELDETEIQTLYNNEPNANILKDFWGNLYLYDKEYILLNLVKP
      238 246 279 286 241
295     NNFINRRDSTLSINNIRSTILLANRLYSIGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
      322 349
355     SKTHLLPIYADTATTNKEKTIKISSSGNRFRQVVMNSVGNCTMNFKNNGNIGLLGFEK
415     ADTVVASTWYTYTHREDNTNSNGFFWNFISEEHGWQEK
      425
-----
12 matches found in sequence:
aaw68396 ; Clostridium botulinum toxin E C fragment.
(from "bt_ags.pep")
TOIG of: aaw68396 check: 4403 from: 1 to: 452

ID      AAW68396 standard; protein; 452 AA.
XX
AC      AAW68396;

```

DE Clostridium botulinum type B toxin.
 XX
 KW Antitoxin; vaccine; neurotoxin; toxin B; intoxication; immunogen;
 KW botulism; BotB.
 OS
 XX Clostridium botulinum; serotype B Danish strain.
 PN WO9808540-A1.
 XX
 PD 05-MAR-1998.
 XX
 PF 28-AUG-1997; 97WO-US015394.
 XX
 PR 28-AUG-1996; 96US-00704159.
 XX
 PA (OPHI-) OPHIDIAN PHARM INC.
 XX
 PI Williams JA, Thalley BS;
 XX
 DR WPI; 1998-230234/20.
 DR N-PSDB; AAV30579.
 XX
 PT Host cell containing recombinant expression vector encoding Clostridium
 PT botulinum type B or E toxin - useful to treat humans and other animals at
 PT risk of intoxication with clostridial toxin.
 XX
 PS Example 35; Page 291-296; 428pp; English.
 XX
 CC This is the amino acid sequence of the type B toxin of Clostridium
 CC botulinum Danish strain. The C fragment (see AAW68393-94) of the serotype
 CC B toxin has been expressed as a histidine-tagged protein in Escherichia
 CC coli. The invention relates to C' botulinum recombinant toxins. Methods
 CC are provided which allow for the isolation of soluble recombinant
 CC proteins free of significant endotoxin contamination. Preferred hosts for
 CC production of the recombinant proteins are E. coli, insect cells and
 CC yeast cells. The recombinant proteins are used as immunogens for the
 CC production of vaccines and antitoxins that are useful in the treatment of
 CC humans and animals at risk of intoxication with clostridial toxin.
 CC (Updated on 17-OCT-2003 to standardise OS field)
 XX
 SQ Sequence 1291 AA;

AAW68392 Length: 1291 August 31, 2004 14:39 Type: P Check: 9788
 Found using 'seq23' (hayes346.key)

1 MPVTINNFYNDPIDNNNIIMPEPPFARGTGRYKAFKITDRWIIPERYTFRGKPEDFN
 33 36
 34 37

61 KSSGIFNRDVCEYDPDYLNTNDKXNI

149 ERKKGIFANLIIFGPGPVINENETIDIGIQNHFASEGFGGIMQMKFCPEYVSFVNNVQE
 199

209 NKGASIFNRGVFSDPALILMHLEIHLVHLGYIKVDDLPVFNPKKFFMQSTDAIQAE

269 LYTGGQDPSIITPSTDKSIYDKVLQNFNGRGIVDRLNKLVCISDPNININIKNFKPKY
 289 329

329 KFVEDSEKYSIDVSEFDKLYKSLMFGFTETNAENYKIKTRASYFSDSLPVPKIKNLLD
 331 349

389 NEIYTIERGFINISDKMEKBYRGQWKAINKQAYEIEISKEHLAVYKIQMCKSVKAFGICID
 421

449 VNEDLFFIADKNSFSDDLKNERIE
 ...
 520 VYEKQPAIKKIFTDENTIFQYLYSQTFLLDIRDISLTSSFDALLFSNKVYSSFFSMDYIK
 570
 580 TANKVVEAGLFAGWVKQIVNDFVIEANKSNTMDKIADISLIVPYIGIALNVGNETAKGNF
 623
 640 ENAFETAGASILLEFIPELLIPVVGAFLESYIDNKNKIITDINALTKRNEKWSMDYGL
 697
 700 IVAQWLSTVNTQFYTIKEGMYKALNYQAOALEEIIKYRYNIYSEKEKSININIDFNDISK
 720 738
 760 LNEGINQAIHNINNFINGSVSYLMKKMIPLA
 ...
 838 FDLSTYNTDILIEFMFNKYNSEILNANIILNLFYKDNLLIDLSSYGAKVEYDGVLENDKN
 888
 898 QFKLTSSANSKIRVTQNNQNIIFNSVFLDPSVSFWIRIPKYKNDGTONYIHNEYTYINCWK
 950
 958 NNSGKISIRGNRIIWTLLIDINGTKSVFFEYNIREDISEYINRWF
 ...
 1008 TNNLNAKIYNGKLESNTDIKDIREVIANGHEIIFKLDGIDIRTOFIWKKYPSIFNTELS
 1058
 1068 QSNIEERYKIOSYSEYKDFWGNPLMYNKEYYMFNAGNKNYSYIKLKKDPSVGEILLTRSKY
 1080 1098 1109
 1128 NQNSKYINVRDLIYGEKFIIRKKSNSQSIINDIVRKEDYIYLDFFNLNQEWRYTYKPK
 1133 1166 1183
 1136 1168
 1188 KEEKLFLAPISDSDEFYNTIQIKEYHQPTYSCQLLFPKDBESTDEIGLIGIHRFYESG
 1205
 1248 IVFEYKDYFCISKWYLKEVKRPYNLKLGNWQFIPKDEGWTE
 1253 1256

 13 matches found in sequence:
 aaw68393 ; Clostridium botulinum toxin B C fragment.
 (from "bt_ags.pep")
 TOIG of: aaw68393 check: 5316 from: 1 to: 472

ID AAW68393 standard; protein; 472 AA.
 XX
 AC AAW68393;
 XX
 DT 07-DEC-1998 (first entry)
 XX
 DE Clostridium botulinum toxin B C fragment.

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SQ Sequence 462 AA;
AAW68390 Length: 462 August 31, 2004 14:39 Type: P Check: 780
Found using 'seq23' (hayes346.key)
...
50 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVVNSMYENFST
100 104
110 SFWRIPKPFNSISLNNEYTIINCMMNSGKWSLNGEIIWTQDTQEIQRVVFYKYSQ
128 146
170 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKPIISNLGNIHASNNIMFKLDGCRDT
230 HRYIWKYFNLFDKELNEKEIKDYDNQNSGILKDFWGDYLDQYDKPYMLNLYDPNKYV
232 237 270 277 288
290 DVNVVGIRGYMYLKGPRGSMVTNTNIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYIN
291 299 347
350 VVVKNKKEYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKKMWLQDNN
350 357
410 G
...
13 matches found in sequence:
aaw68391 ; Clostridium botulinum toxin A fragment C (His-tagged).
(from "bt_ags.pep")
TOIG of: aaw68391 check: 9134 from: 1 to: 445
ID AAW68391 standard; protein; 445 AA.
XX AC AAW68391;
XX DT 07-DEC-1998 (first entry)
XX DE Clostridium botulinum toxin A fragment C (His-tagged).
XX KW Antitoxin; vaccine; neurotoxin; toxin A; intoxication; immunogen;
XX OS Clostridium botulinum; serotype A.
XX OS Synthetic.
XX Key Location/Qualifiers
XX FT Peptide 1..7
XX FT /note= "N-terminal histidine tag"
XX PN WO9808540-A1.
XX PD 05-MAR-1998.
XX PF 28-AUG-1997; 97WO-US015394.
XX PR 28-AUG-1996; 96US-00704159.
XX PA (OPHI-) OPHIDIAN PHARM INC.
XX PI Williams JA, Thalley BS;
XX
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DR WPI; 1998-230234/20.
N-PSDB; AAV30576.
Host cell containing recombinant expression vector encoding Clostridium
botulinum type B or E toxin - useful to treat humans and other animals at
risk of intoxication with clostridial toxin.
Example 29; Page 279-281; 428pp; English.
This is the amino acid sequence of a histidine-tagged fragment C
polypeptide of Clostridium botulinum serotype A toxin encoded by a DNA
sequence (see AAV30576) in plasmid p6HisBot(syn). This vector was used to
express native soluble C fragment in Escherichia coli host cells, with
the recombinant C fragment being purified on a poly-histidine binding
affinity resin. The invention relates to recombinant proteins derived
from C. botulinum toxins. Methods are provided which allow the isolation
of soluble recombinant proteins that are free of significant endotoxin
contamination. Preferred hosts for production of recombinant proteins are
E. coli, insect cells and yeast cells. The recombinant toxins are used as
immunogens for the production of vaccines and antitoxins that are useful
in the treatment of humans and animals at risk of intoxication with
clostridial toxin
XX Sequence 445 AA;
AAW68391 Length: 445 August 31, 2004 14:39 Type: P Check: 9134
Found using 'seq23' (hayes346.key)
...
33 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVVNSMYENFST
83 86 87 90
93 SFWRIPKPFNSISLNNEYTIINCMMNSGKWSLNGEIIWTQDTQEIQRVVFYKYSQ
111 129 150
153 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKPIISNLGNIHASNNIMFKLDGCRDT
153
213 HRYIWKYFNLFDKELNEKEIKDYDNQNSGILKDFWGDYLDQYDKPYMLNLYDPNKYV
215 220 253 260 271
273 DVNVVGIRGYMYLKGPRGSMVTNTNIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYIN
274 282 330
333 VVVKNKKEYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKKMWLQDNN
333 340
393 G
...
-----
26 matches found in sequence:
aaw68392 ; Clostridium botulinum type B toxin.
(from "bt_ags.pep")
TOIG of: aaw68392 check: 9788 from: 1 to: 1291
ID AAW68392 standard; protein; 1291 AA.
XX AC AAW68392;
XX DT 17-OCT-2003 (revised)
XX DT 07-DEC-1998 (first entry)
XX
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DT 17-OCT-2003 (revised)
DT 07-DEC-1998 (first entry)
DE Clostridium botulinum toxin A fragment C.
KW Antitoxin; vaccine; neurotoxin; toxin A; intoxication; immunogen;
KW botulism.
XX Clostridium botulinum; serotype A.
FH Key Location/Qualifiers
FT Misc-difference 1..2
FT /note= "vector-derived amino acid residues"
XX
XX WO9808540-A1.
XX 05-MAR-1998.
XX 28-AUG-1997; 97WO-US015394.
XX 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30571.
XX Host cell containing recombinant expression vector encoding Clostridium
XX botulinum type B or E toxin - useful to treat humans and other animals at
XX risk of intoxication with clostridial toxin.
XX Example 22; Page 262-263; 428pp; English.
XX This is the amino acid sequence of Clostridium botulinum serotype A toxin
XX C-fragment expressed by a DNA sequence (see AAV30571) in plasmid
XX pAlterBot. Recombinant C-fragment proteins have been produced in
XX Escherichia coli as fusion proteins with either maltose binding protein
XX or Clostridium difficile type A toxin (see AAW68387). The invention
XX relates to recombinant proteins derived from C. botulinum toxins. Methods
XX are provided which allow for the isolation of soluble recombinant toxin
XX proteins free of significant endotoxin contamination. Preferred hosts for
XX production of the recombinant proteins are E. coli, insect cells and
XX yeast cells. The recombinant toxin proteins are used as immunogens for
XX the production of vaccines and antitoxins that are useful in the
XX treatment of humans and animals at risk of intoxication with clostridial
XX toxin. (Updated on 17-OCT-2003 to standardise OS field)
XX
XX Sequence 438 AA;
AAW68389 Length: 438 August 31, 2004 14:39 Type: P Check: 1315
Found using 'seq23' (hayes346.key)
...
26 ESNHLIDLSRYASKINIGKVNFPIDKNQIQLFNLESSKIEVILKNAIVNMSYENFST
76 79
80 83
86 SFWIRIPKVFNSISLNNEVTINCMENNNGWKVSNLYGIIITWLOTQTOEIKORVVFKYSQ
104
122
143
146 MINISDIYINRWTFVITNNRNNSKIYINGRLIDQKPIISNLGNHASNIMFKLDCGRDT
146
206 HRYIWIYKFNFLFDKELNEKEIKDLYDNQNSGILKDFWGDYQLQYDKPVMNLNLYDPNKYV
208 213
246 253
264
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266 DVNNVGIRGYMLKGRGSMVTNTIYLNSSLYRGTKFKIHKYASGNKDNVVRNDRVYN
267 275
276 323
326 VVVKNKEFRLATNINASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKKMNLDNN
326 333
386 G
...
-----
13 matches found in sequence:
aaw68390 ; Clostridium botulinum toxin A fragment C (His-tagged).
(from "bt ags pep")
TOIG of: aaw68390 check: 780 from: 1 to: 462
ID AAW68390 standard; protein; 462 AA.
XX
XX AAW68390;
XX
XX 07-DEC-1998 (first entry)
XX Clostridium botulinum toxin A fragment C (His-tagged).
XX Antitoxin; vaccine; neurotoxin; toxin A; intoxication; immunogen;
XX botulism.
XX Clostridium botulinum; serotype A.
XX Synthetic.
XX Key Location/Qualifiers
XX FH Peptide 1..21
XX FT /note= "N-terminal histidine tag"
XX PN WO9808540-A1.
XX PD 05-MAR-1998.
XX PF 28-AUG-1997; 97WO-US015394.
XX PR 28-AUG-1996; 96US-00704159.
XX PA (OPHI-) OPHIDIAN PHARM INC.
XX PI Williams JA, Thalley BS;
XX DR WPI; 1998-230234/20.
XX DR N-PSDB; AAV30572, AAV30575.
XX PT Host cell containing recombinant expression vector encoding Clostridium
XX botulinum type B or E toxin - useful to treat humans and other animals at
XX risk of intoxication with clostridial toxin.
XX PS Example 24; Page 265-267; 428pp; English.
XX This is the amino acid sequence of a histidine-tagged fragment C
XX polypeptide of Clostridium botulinum serotype A toxin encoded by a DNA
XX sequence (see AAV30572) in plasmid pHisBot, and by a DNA sequence (see
XX AAV30575) in pHisBota. These vectors were used to express native (i.e.
XX non-fusion) soluble C fragment in Escherichia coli host cells, with the
XX recombinant C fragment being purified on a poly-histidine binding
XX affinity resin. The invention relates to recombinant proteins derived
XX from C. botulinum toxins. Methods are provided which allow the isolation
XX of soluble recombinant proteins that are free of significant endotoxin
XX contamination. Preferred hosts for production of recombinant proteins are
XX E. coli, insect cells and yeast cells. The recombinant toxins are used as
XX immunogens for the production of vaccines and antitoxins that are useful
XX in the treatment of humans and animals at risk of intoxication with
XX clostridial toxin
XX
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640 ENAFETAGASILLFPELLIPVVGAFLLSEYIDNKNKIITIDNALTNRKNEKWSMYGL
      |---|
700 IVAQWLSTVNTQFYTIKEGMYKALNYQAALAEIIKVRYNIYSEKESKNINIDFNDSK
      |---|
700 700
760 LNEGQAINNINNFNGSCVSYLMMKKMPLA
      |---|
      738

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17 matches found in sequence:
aaw56019 ; Recombinant botulinum neurotoxin type A LH423/A (Q2E,N26K,A27Y).
(from "bt_ags.pep")
TOIG of: aaw56019 check: 6527 from: 1 to: 871

ID AAW56019 standard; protein; 871 AA.
XX
AC AAW56019;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A LH423/A (Q2E,N26K,A27Y).
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
(MICR-) MICROBIOLOGICAL RES AUTHORITY.
(SPEY-) SPEYWOOD LAB LTD.
PA
PA Shone CC, Quinn CP, Foster KA;
PI
XX
XX WPI; 1998-169168/15.
DR
DR N-PSDB; AAV26291.
XX
Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
Example 1; Page 108-111; 137pp; English.
XX
The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX

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SQ Sequence 871 AA;
AAW56019 Length: 871 August 31, 2004 14:39 Type: P Check: 6527
Found using 'seq23' (hayes346.key)

1 MQFVNKQFNKDPVNGVDIAVIKIPNAGQMOPVKAFKIHNKIWIPIPERDFTNPEEGDLN
  |---|
  21 24
61 PPPEAKQVPVSYD
...
135 INVIQPDGSRSEELNLVIIGPSADIIQFECKSPGHEVLNLTNRNGYSGSTOYIRSPDFTF
  |---|
  185
195 GFESLEVDTNPLLGAGKGFATDPAVTLAHELHAGHRLYGIAINPNRVFKVNTNAYEEMS
  |---|
  233
255 GLEVSFBEELRTFGGHDAKFIDSLOENEFRLYYNKKFKDIASLTLNKAKSIVGTTASLQIMK
  |---|
  287
315 NVFKEKILLSSETSGKFSVDKLFKFDKLYKMLTEIYTEDNFVKFKVLNRKTYLNFDKAVF
  |---|
  342
375 KINIVPKVNYTYIDGFENLRNTNLAANFGQNTENNMMFTKLKNFTGLGFYFYKLLCVRGI
  |---|
  384 387
435 ITSKTSLDKYGNKALNDLCIKVNNWDLFFSPSEDNFTDNLNKGEEITSDTNIEAAEENI
  |---|
  446
495 SLDLIQYYLTFNFDNFPENISLENLSDIIGQLMLPNIERFPNGKKYELDKTYTMFHYL
  |---|
  503
555 -| PAQFEHCKSRIALTNSVNEALLNPSRVYTFESSDYVKKVNKATEAAMFLGWVEQLVYDF
  |---|
  556
615 TDETSEVSTTDKIADITIIPIY
...
660 GAVILLEFIPEIAPVLGTFALVSVYANKVLTVQTIDNALSKRNEKWDDEVKYIVTNWLA
  |---|
  710
720 KVTNQIDLRKKKEALENQAEATKAIINYQYNOYTEBEKNNINFNIDLSLKLNESIK
  |---|
  751
780 AMININKFLNQCVSYLMNSMIPYG
...
-----
13 matches found in sequence:
aaw68389 ; Clostridium botulinum toxin A fragment C.
(from "bt_ags.pep")
TOIG of: aaw68389 check: 1315 from: 1 to: 438

ID AAW68389 standard; protein; 438 AA.
XX
AC AAW68389;
XX

```

```
197 GFESLEVDNPLLGAGKATDPAVTLAHELHAGHLYGIAINPRVFKVNTNAYEMS
235
257 GLEVSPEELRTFGHDAKFIDSLOQENEFRLYYNKKFKDIASTLNKAKSIVGTTASLQYMK
289
317 NVFKEKILLSSETSGFSVDKLFKDKLYKMLTEIYTEDNFVKFKVNLNRTYLNFDKAVF
344
377 KINIVPKNYTYIDGFNLNLTNLAAMFNGQNTENNMTKLNFTGLFEFYKLLCVRGI
386
437 ITSKTKSLDKGYNKALNDLCIKVNNWDLFPSPSEDNFTNDLNKGEIITSDTNEAAEENI
448
497 SLDLIOQYLYTFNFDNEPENISIELSSDIIGQLMPNIERFPNGKVELDKYTMFHYL
505
557 RAQEPHGKSRIALTNSVNEALLNPRSVTFPSSDYVKVKVKNKATEAAMFLGWVEQLVYDF
585
617 TDETSEVSTTDKIADITIIPY
...
662 GAVILLEFIPEIAPVLGTFAVSYIANKVLTVQITDNLALSKEKNEKWDVEYKYIVTNWLA
712
722 KVTQIDLIRKKMEALENOAEATKAIINYQNYTEEEKNNINFNIDLSKKNESINK
753
782 AMININKFLNQCYSVYLMNSMIPYG
...
-----
21 matches found in sequence:
aaw56017 ; Recombinant botulinum neurotoxin type B LH728/B.
(from "bt_ags.pep")
TOIG of: aaw56017 check: 8491 from: 1 to: 1169

ID AAW56017 standard; protein; 1169 AA.
XX
AC AAW56017;
AC
DT 27-JUL-1998 (first entry)
DT
XX
DE Recombinant botulinum neurotoxin type B LH728/B.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
XX 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
```

```
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
PI Shone CC, Quinn CP, Foster KA;
XX
DR WPI; 1998-169168/15.
DR N-PSDB; AAV26289.
XX
PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 2; Page 91-94; 137pp; English.
XX
CC The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 1169 AA;

AAW56017 Length: 1169 August 31, 2004 14:39 Type: P Check: 8491 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNFNNDPIDNNNIIMMEPPFARGTGRYKAFKITDRIWIIPERYTGYKPEDFN
33 36
34 37
61 KSGGIFNRDVCEYYDPDYLTNDKKNI
...
149 ERKKGIFANLIIFGPGVNLNENETIDIGIONHFASREGFGGIMQMFKFCPEYVSVFNNVQE
199
209 NKGASIFNRRGYFSDPALIMHELHVLHGLYGIKVDDLPVFNKKKFFMQSTDAIQAE
269 LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVDRLNKVLVCISDPNININIKNFKDKY
289
329 KFVEDSEGKYSIDVESFDKLYKSLMFGFTTETNAENYKIKTRASYSDSLPPVKIKNLLD
331
349
389 NEIYTIIEGFNISDKDMEKEYRGONKAINKQAYEEISKEHLAVYKIQMCKSVKAPGICID
421
449 VDNEDLFFIADKNSFSDLSKNERIE
...
520 VYEKQPAKKIETDENTIFQYLYSQTFPLDIRDISLTSSFDALLFSNKVYSEFFSMDYIK
570
```

```

580      TANKVEAGLFAGWVKQIVNDFVIEANKSNMTDKIADISLIVPYIGLALVGNETAQGNF
      |--|
      623
640      ENAPEIAGASILLEFPELLIPVVGAFLESYIDNKNKIITIDNALTCKRNEKWSMYGL
      |--|
      697
700      IVAQWLSTVNTQFTYIKEGMYKALNYQAQALEEIKYRYNIYSEKESKNINIDFNDINSK
      |--|
      700      720
760      LNEGQAIDNINNFINNGCSVYLKMKWIPLA
      |--|
      738
...
838      FDLSTYNTDTILIEFMFNKYNSEILNIIILNRYKDNLLDLSGYCAKVEVVDGVELNDKN
      |--|
      888
898      QFKLTSSANSKIRVTQNIIFNSVFLDFSFWIRIPKYNKDGIQNIHNEYTIINCMK
      |--|
      950
958      NSGWKISIRGNRIIWTLDINGTKSVFFPEYNIREDISEVINRWF
      |--|
      1098
...
1008      TNNLNNAKIYINGKLESNTDIKIDREVIANGEEIIFKLDGDIRTQFIWMKYFSIFNTELS
      |--|
      1058
1068      QSNTEERYKQSYSEYKDFWGNPLMNYKYMFMAGNKNYIILKKDSPVGEILTRSKY
      |--|
      1080      1098      1109
1128      NQNSKIYNRDLTYIGEXEFLIRKNSQSINDDIVRKEDYIYL
      |--|
      1133      1136      1166

-----
12 matches found in sequence:
aaw56018; Recombinant botulinum neurotoxin type B LH417/B.
(from "bt_ags.pep")
TOIG of: aaw56018 check: 4602 from: 1 to: 858

ID  AAW56018 standard; protein; 858 AA.
XX
AC  AAW56018;
XX
DT  27-JUL-1998 (first entry)
XX
DE  Recombinant botulinum neurotoxin type B LH417/B.
XX
KW  Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX  detection; tetanus; non-toxic; toxin.
XX
OS  Synthetic.
OS  Clostridium botulinum.
XX
PN  WO9807864-A1.
XX
PD  26-FEB-1998.
XX
XX  22-AUG-1997; 97WO-GB002273.
XX
PR  23-AUG-1996; 96GB-00017671.
PR  13-DEC-1996; 96GB-00025996.
XX
PA  (MTCR-) MICROBIOLOGICAL RES AUTHORITY.
PA  (SPEY-) SPEYWOOD LAB LTD.

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XX      Shone CC, Quinn CP, Foster KA;
PI      WPI; 1998-169168/15.
XX      N-PSDB; AAV26290.
DR      Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
XX      immunogens or as non-toxic standards for the detection of neurotoxins.
PT
XX      Example 2; Page 98-100; 137pp; English.
PS
XX      The present sequence represents a recombinant neurotoxin protein from the
XX      present invention. The present invention describes recombinant neurotoxin
XX      proteins which comprise a first and second domain, where the first domain
XX      is adapted to cleave one or more vesicle or plasma-membrane associated
XX      proteins essential to exocytosis, and where the second domain is adapted:
XX      (a) to translocate the protein into a cell; (b) to increase the
XX      solubility of the protein compared to the solubility of the first domain
XX      on its own, or (c) both to translocate the protein into a cell and to
XX      increase the solubility of the protein compared to the solubility of the
XX      first domain on its own, the protein being free of clostridial neurotoxin
XX      (CN) and free of CN precursor that can be converted into toxin by
XX      proteolytic action. The recombinant proteins can be used as therapeutic
XX      agents for targeting cells expressing a relevant substrate. The products
XX      can also be used as immunogens and as non-toxic standards for the
XX      assessment and development of in vitro assays for the detection of
XX      functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX      environmental samples
XX      Sequence 858 AA;
SQ
AAW56018 Length: 858 August 31, 2004 14:39 Type: P Check: 4602 ..
Found using 'seq23' (hayes346.key)
|--|
|--|
1  MPVTINNPNVNDPIDNNNIIMMEPPFARGTGYYKAFKITDRIWIIPERYTFGYKPEDFN
   33 36
   34 37
61  KSGIFNRDVCVEYDYPDLNTNDKNI
...
149  ERKGIFANLIIFGPGVNLNETIDIGIQNHFPASREGFGGIMQMCKPFEYVSFNVNQVE
      |--|
      199
209  NKGASIFNRRGYFSDPALILMHELHVLHGLYGIKVDLDPIVPNEKKFFMQSTDAIQAE
      |--|
      289
269  LYTFGGQDPFSIITPSTDKSIYDKVLQNGRGIIVRLNKLVCISDENININIKNFKDKY
      |--|
      309
329  KFDVDSGKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSFSLPPVKIKNLLD
      |--|
      331      349
389  NEYTIIEGFINSDKMEKEYRGONKAINQAYBEISKEHLAVYKIQMCKSVKAPGICID
      |--|
      421
449  VDNEDLPIADKNSFSDDLKSKNERIE
...
520  VYEKQPAIKKIFTDENTIFQYLSQTFPLDIRDISLTSSFDALLFSNKNVYSFFSMDYIK
      |--|
      570
580  TANKVEAGLFAGWVKQIVNDFVIEANKSNMTDKIADISLIVPYIGLALVGNETAQGNF
      |--|
      623

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15-JUL-2002 (first entry)
 Botulinum toxin type A Halla light chain.
 Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm; dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation; eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis; neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism; anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache; excessive gastrointestinal secretion; botulinum toxin type A; Halla; light chain.
 Clostridium botulinum.
 OS
 XX
 PH Key Location/Qualifiers
 FT Region 9..12
 FT /label= Tyrosine_motif
 FT Region 20..23
 FT /label= Tyrosine_motif
 FT Region 72..75
 FT /label= Tyrosine_motif
 FT Region 179..182
 FT /label= Tyrosine_motif
 FT Region 286..289
 FT /label= Tyrosine_motif
 FT Region 311..314
 FT /label= Tyrosine_motif
 FT Region 341..344
 FT /label= Tyrosine_motif
 FT Region 365..368
 FT /label= Tyrosine_motif
 FT Region 422..428
 FT /label= Tyrosine_motif
 XX
 PN WO200208268-A2.
 XX
 XX 31-JAN-2002.
 XX
 XX 20-JUL-2001; 2001WO-US023122.
 XX
 XX 21-JUL-2000; 2000US-00620840.
 XX
 XX (ALLR) ALLERGAN SALES INC.
 XX
 XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
 XX WPI; 2002-241566/29.
 XX
 XX Novel modified neurotoxin comprising structural modification which alters the biological persistence and/or biological activity of a neurotoxin, useful for treating neuromuscular or autonomic disorder, or pain.
 XX
 XX Example 14; Fig 3; 102pp; English.
 XX
 XX The sequence represents the botulinum toxin type A Halla light chain. The invention relates to a novel modified neurotoxin including a structural modification, where the structural modification is effective to alter the biological persistence, or biological activity. The modified neurotoxin is useful for treating spasmodic dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia, cervical dystonia, focal hand dystonia, blepharospasm, strabismus, hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics, tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation, hyperhidrosis, excessive salivation, excessive gastrointestinal secretions, pain from muscle spasms, headache pain, brow furrows or skin wrinkles
 XX
 XX Sequence 437 AA;
 XX
 XX ABB0653 Length: 437 August 31, 2004 14:39 Type: P Check: 6765
 XX Found using 'seq23' (hayes346.key)
 XX
 XX |--|

1 PFVNQPNYKDPVNGVDIAYIKIPNVGQMPVKAFKIHNKIWIPIPERDTFTNPEEGDLP
 20 23
 61 PPEAKQPVSVYYD
 ...
 134 INVIOPGSYRSEELNLVIIGPSADIQPECKSFGEVLNLTRNGYGSQYIRFSPDFTF
 184
 194 GFESLEVDTNPLLGAGKATDPAVTLAHLIHAGRLYGIAINPNRVKVNNTAYEIMS
 232
 254 GLEVSFEELRTFGHDAKFIDSLQENEPRLYYNKNFKDIASTLNKAKSIVGTTSIQYMK
 286
 314 NVFKKYLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVFKFKLNKRTYLNFDKAVF
 341
 374 KINIVPKVNYTIYDGFNLRTNLAANFNQNTENNMMFTKLKNFTGLPEFYKLLCVRGI
 383 386
 434 ITSK

 7 matches found in sequence:
 abb80654 ; Botulinum toxin type B Danish I light chain.
 (from "bt_ags.pep")
 TOIG of: abb80654 check: 9222 from: 1 to: 441
 ID ABB80654 standard; peptide; 441 AA.
 XX
 AC ABB80654;
 XX
 DT 15-JUL-2002 (first entry)
 XX
 DE Botulinum toxin type B Danish I light chain.
 XX
 KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;
 KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;
 KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;
 KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;
 KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;
 KW excessive gastrointestinal secretion; botulinum toxin type B; Danish I;
 KW light chain.
 XX
 OS Clostridium botulinum.
 XX
 PN WO200208268-A2.
 XX
 XX 31-JAN-2002.
 XX
 XX 20-JUL-2001; 2001WO-US023122.
 XX
 XX 21-JUL-2000; 2000US-00620840.
 XX
 XX (ALLR) ALLERGAN SALES INC.
 XX
 XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
 XX WPI; 2002-241566/29.
 XX
 XX Novel modified neurotoxin comprising structural modification which alters the biological persistence and/or biological activity of a neurotoxin, useful for treating neuromuscular or autonomic disorder, or pain.

KW Botulinum neurotoxin type D; BoNT; botulism; non-toxic; vaccine; poison; protect.

XX OS Clostridium botulinum.

XX PN WO200005252-A1.

XX PD 03-FEB-2000.

XX PF 20-JUL-1999; 99WO-IB001301.

XX PR 22-JUL-1998; 98ZA-00006538.

XX PA (AGRI-) AGRIC RES COUNCIL.

XX PI De Bruyn EE, Botha AD;

XX WPI; 2000-205375/18.

XX N-PSDB; AAZ98630, AAZ98631.

XX Non-toxic immunogenic derivative of Clostridium botulinum neurotoxin type D, useful in vaccines for protection against botulism, comprises at least one amino acid mutation not present in the wild type D neurotoxins.

XX Claim 3, 4; Page 54-57; 66pp; English.

XX This sequence represents the amino acid sequence of a synthetic non-toxic immunogenic derivative of Clostridium botulinum type D toxin (BoNT).

XX Botulinum neurotoxin causes botulism poisoning in cattle and sheep, and usually results in the death of the affected or poisoned animal. The non-toxic immunogenic fragments of the C. botulinum neurotoxin are useful in vaccines to protect animals (e.g. humans, cattle, sheep, pigs) against BoNT type D poisoning. The non-toxic fragments can be produced relatively simply and inexpensively (specifically by fermentation techniques). As the fragments are not toxic the risk to production staff is reduced

XX Sequence 399 AA;

AAV78982 Length: 399 August 31, 2004 14:39 Type: P Check: 2461 ..

Found using 'seq23' (hayes346.key)

1 AEVFEVGNVQLPIFPDFKLGSSDGRGLIVTQENIVNMYVESFSISFWIRINKWV 41 44 45 48

61 SNLPGYTIIDSVKNSGWSIGIISNFIIVFTLQKENSQDINFSDISKNAAGYNKWFV 66 69 114

121 TITNMGNMIIYINGKLIDTIKVKELTGINFSTIITFQMKIPNTGLITSDSDNINMWI

181 RDFYIFAKELDDKDINILFNSLQVTNVDKYGWGNLDKYDYMVNVNMYNRYMSKKGNG 184 204 222

241 IVFNTRKNNDNFEGYKIIIRKIRGNTNDTRVGRGNVLYFNTTIDNKQYSLGMYKPSRNL 256

301 GTDLVPLGALDQPMDEIRKYGSLIQCPTFDYASQLFLSSNATNRLGILSIGSYSEFK 320

361 LGDDYWFNHEYLIPVKIKIEHYASLLESTSTHWFVPASE 381

1 match found in sequence:
abb80641 ; Clostridium botulinum botulinum toxin type A leucine based motif.
(from "bt_ags.pep")

TOIG of: abb80641 check: 2137 from: 1 to: 7

ID ABB80641 standard; peptide; 7 AA.

XX AC ABB80641;

XX DT 15-JUL-2002 (first entry)

XX Clostridium botulinum botulinum toxin type A leucine based motif.

XX Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm; dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation; eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis; neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism; anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache; excessive gastrointestinal secretion; leucine-based motif; botulinum.

XX Clostridium botulinum.

XX WO200208268-A2.

XX 31-JAN-2002.

XX 20-JUL-2001; 2001WO-US023122.

XX 21-JUL-2000; 2000US-00620840.

XX (ALLR) ALLERGAN SALES INC.

XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX WPI; 2002-241566/29.

XX Novel modified neurotoxin comprising structural modification which alters the biological persistence and/or biological activity of a neurotoxin, useful for treating neuromuscular or autonomic disorder, or pain.

XX Claim 28; Page 76; 102pp; English.

XX The sequence represents a leucine based motif from Clostridium botulinum, botulinum toxin type A, which may act as a biological persistence enhancing component in a neurotoxin. The invention relates to a novel modified neurotoxin including a structural modification, where the structural modification is effective to alter the biological persistence, or biological activity. The modified neurotoxin is useful for treating or spasmodic dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia, cervical dystonia, focal hand dystonia, blepharospasm, strabismus, hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics, tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation, hyperhidrosis, excessive salivation, excessive gastrointestinal secretions, pain from muscle spasms, headache pain, brow furrows or skin wrinkles

XX Sequence 7 AA;

ABB80641 Length: 7 August 31, 2004 14:39 Type: P Check: 2137 ..

Found using 'seq23' (hayes346.key)

1 FEFVKLL 4 7

10 matches found in sequence:
abb80653 ; Botulinum toxin type A HallA light chain.
(from "bt_ags.pep")
TOIG of: abb80653 check: 6765 from: 1 to: 437

ID ABB80653 standard; peptide; 437 AA.

XX AC ABB80653;

XX

10 matches found in sequence:
 abb80656 ; Botulinum toxin type A Halla light chain L427A/L428A mutant.
 (from "bt_ags.pep")
 TOIG of: abb80656 check: 6138 from: 1 to: 437

ID ABB80656 standard; peptide; 437 AA.
 XX
 AC ABB80656;
 XX
 DT 15-JUL-2002 (first entry)
 XX
 DE Botulinum toxin type A Halla light chain L427A/L428A mutant.
 XX
 KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;
 KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;
 KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;
 KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;
 KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;
 KW excessive gastrointestinal secretion; botulinum toxin type A; Halla;
 KW light chain.
 XX
 OS Clostridium botulinum.
 OS Synthetic.
 XX
 FH Key Location/Qualifiers
 FT Misc-difference 427
 FT /note= "Wild-type Leu substituted by Ala"
 FT
 FT Misc-difference 428
 FT /note= "Wild-type Leu substituted by Ala"
 FT
 XX
 PN WO200208268-A2.
 XX
 PD 31-JAN-2002.
 XX
 PF 20-JUL-2001; 2001WO-US023122.
 XX
 PR 21-JUL-2000; 2000US-00620840.
 XX
 PA (ALLR) ALLERGAN SALES INC.
 XX
 PI Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
 XX
 DR WPI; 2002-241566/29.
 XX
 XX Novel modified neurotoxin comprising structural modification which alters
 PT the biological persistence and/or biological activity of a neurotoxin,
 PT useful for treating neuromuscular or autonomic disorder, or pain.
 XX
 PS Example 14; Page; 102pp; English.
 XX
 CC The sequence represents a mutant of the botulinum toxin type A Halla
 CC light chain, in which the leucine residues at positions 427 and 428 have
 CC been substituted by alanine. The invention relates to a novel modified
 CC neurotoxin including a structural modification, where the structural
 CC modification is effective to alter the biological persistence, or
 CC biological activity. The modified neurotoxin is useful for treating
 CC spasmodic dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual
 CC dystonia, cervical dystonia, focal hand dystonia, blepharospasm,
 CC strabismus, hemifacial spasm, eyelid disorder, cerebral palsy, focal
 CC spasticity, spasmodic colitis, neurogenic bladder, anismus, limb
 CC spasticity, tics, tremors, bruxism, anal fissure, achalasia, limb
 CC lacrimation, hyperhidrosis, excessive salivation, excessive
 CC gastrointestinal secretions, pain from muscle spasms, headache pain, brow
 CC furrows or skin wrinkles. Note: The present sequence is not shown in the
 CC specification but is derived from the sequence information given in
 CC Figure 3 and on page 66
 XX
 SQ Sequence 437 AA;
 ABB80656 Length: 437 August 31, 2004 14:39 Type: P Check: 6138 ..
 Found using 'seq23' (hayes346.key)

1 PFVNKQFNKYKDPVNGVDIAYIKIPNVGQMPQVKAFAKIHNNKIWIPIPERDFTFTPEEGDLP
 20 23
 61 PPEAKQVPVSYD
 ...
 134 INVIQPDGYSRSEELNLVIIGPSADIIQFECKSFGEVLNLTNRNGYSTOYIRFSPDFTF
 184
 194 GFESLEVDTNPLLGAGKATDPAVTLAHLIHAGHRLYGIAINPNRVKVNNTNAYEEMS
 232
 254 GLEVSFEELRTFGHDAKFIDSLOENEFRLYYNKKFKDIASLTINKAKSIUVTASTLOYMK
 286
 314 NVFKKYLSEDTSGKFSVDKLFKFKLTKYKMLTEIYTEDNFKVFKVNLNRTYLNPKAVF
 341
 374 KINIVPKVNTIYDGFNLRTNLAANFNQNTNINNMFTKLKNFTGLFEFYKACVIRGI
 383
 434 ITSK
 386
 425

1 match found in sequence:
 abb80663 ; Wildtype botulinum toxin type A light chain C-terminal region.
 (from "bt_ags.pep")
 TOIG of: abb80663 check: 8911 from: 1 to: 27

ID ABB80663 standard; peptide; 27 AA.
 XX
 AC ABB80663;
 XX
 DT 15-JUL-2002 (first entry)
 XX
 DE Wildtype botulinum toxin type A light chain C-terminal region.
 XX
 KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;
 KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;
 KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;
 KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;
 KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;
 KW excessive gastrointestinal secretion; botulinum toxin type A; C-terminus.
 XX
 OS Clostridium botulinum.
 XX
 PN WO200208268-A2.
 XX
 PD 31-JAN-2002.
 XX
 PF 20-JUL-2001; 2001WO-US023122.
 XX
 PR 21-JUL-2000; 2000US-00620840.
 XX
 PA (ALLR) ALLERGAN SALES INC.
 XX
 PI Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
 XX
 DR WPI; 2002-241566/29.
 XX
 XX Novel modified neurotoxin comprising structural modification which alters
 PT the biological persistence and/or biological activity of a neurotoxin,
 PT useful for treating neuromuscular or autonomic disorder, or pain.
 XX
 PS Example 15; Fig 10; 102pp; English.

PS Disclosure; Fig 8; 102pp; English.

XX The sequence represents the botulinum toxin type B Danish I light chain.

CC The invention relates to a novel modified neurotoxin including a

CC structural modification, where the structural modification is effective

CC to alter the biological persistence, or biological activity. The modified

CC neurotoxin is useful for treating spasmodic dysphonia, laryngeal

CC dystonia, oromandibular dysphonia, lingual dystonia, cervical dystonia,

CC focal hand dystonia, blepharospasm, strabismus, hemifacial spasm, eyelid

CC disorder, cerebral palsy, focal spasticity, spasmodic colitis, neurogenic

CC bladder, anismus, limb spasticity, tics, tremors, bruxism, anal fissure,

CC achalasia, dysphagia, lacrimation, hyperhidrosis, excessive salivation,

CC excessive gastrointestinal secretions, pain from muscle spasms, headache

CC pain, brow furrows or skin wrinkles

XX Sequence 441 AA;

SQ ABB80654 Length: 441 August 31, 2004 14:39 Type: P Check: 9222 ..

Found using 'seq23' (hayes346.key)

1 MPVTINNENVPIDNNIIMPEPPFARGTGRYKAFKITDRWIIPERYTFGYPEDFN

33 36

34 37

61 KSGIFNRDVCYEDDYDLNTNDKNI

....

149 ERKKGIFANLIFGPGPVINENETIDIGIQNHASREGFGGIMQKFCPEXVSFNNVQE

199

209 NKGASIFNRGYFSDPALILMHILHVLHGLYGIKVDLPIVPNEKKPFMQSDTAIQAE

269 LYTFGGQPSIITSTDKSIYDKVLQFRGIVDLRLKVLVCISDFNININIKNFKDKY

289

329 KFVEDSEKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASVFSDSLPPVKIKNLLD

331

389 NEITYIEGFNISDKOMEKEYRGQNKAINKQAYEIEISKEHLAVYKIOMCKSVK

421

9 matches found in sequence:

abb80655 ; Botulinum toxin type A Halla light chain dell-8/416-437 mutant.

(from "bt.ags.pep")

TOIG of: abb80655 check: 2399 from: 1 to: 407

ID ABB80655 standard; peptide; 407 AA.

XX AC ABB80655;

XX 15-JUL-2002 (first entry)

DT Botulinum toxin type A Halla light chain dell-8/416-437 mutant.

DE

XX Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;

KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;

KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;

KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;

KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;

KW excessive gastrointestinal secretion; botulinum toxin type A; Halla;

KW light chain.

XX Clostridium botulinum.

OS Synthetic.

PN WO200208268-A2.

XX 31-JAN-2002.

XX 20-JUL-2001; 2001WO-US023122.

PF 21-JUL-2000; 2000US-00620940.

PR (ALLR) ALLERGAN SALES INC.

PA Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

PI WPI; 2002-241566/29.

DR Novel modified neurotoxin comprising structural modification which alters

PT the biological persistence and/or biological activity of a neurotoxin,

PT useful for treating neuromuscular or autonomic disorder, or pain.

XX Example 15; Page: 102pp; English.

PS The sequence represents a mutant of the botulinum toxin type A Halla

XX light chain, in which the 8 amino acids at the N-terminus and 22 amino

CC acids at the C-terminus have been deleted. The invention relates to a

CC novel modified neurotoxin including a structural modification, where the

CC structural modification is effective to alter the biological persistence,

CC or biological activity. The modified neurotoxin is useful for treating

CC spasmodic dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual

CC dystonia, cervical dystonia, focal hand dystonia, blepharospasm,

CC strabismus, hemifacial spasm, eyelid disorder, cerebral palsy, limb

CC spasticity, spasmodic colitis, neurogenic bladder, anismus, limb

CC lacrimation, tics, tremors, bruxism, anal fissure, achalasia, dysphagia,

CC gastrointestinal secretions, pain from muscle spasms, headache pain, brow

CC furrows or skin wrinkles. Note: The present sequence is not shown in the

CC specification but is derived from the sequence information given in

CC Figure 3 and on page 69

XX Sequence 407 AA;

SQ ABB80655 Length: 407 August 31, 2004 14:39 Type: P Check: 2399 ..

Found using 'seq23' (hayes346.key)

1 YKDPVNGVDIAYIKIPNVGMQPVKAFKHKNKIWIPIPERDTFTNPEEGDLNPPPEAKQVP

12 15

61 VSYVD

...

126 INVIQDGSYRSEELNLVIIGPSADIIQFECKSGFHEVLNLTNGYGSQYIRFSPDFTF

176

186 GFESLEVDVTNPLLGAGKFPATDPAVTLAHELHAGHRLYGIATINPNRNVKVTNAYEYS

224

246 GLEVSFEELRTFGGHDAKFIDSLQENEFLYYKFKDIASLTINKAKSIVGTATSIQYMK

278

306 NVFKEKYLSEDTSGKFSVDKLFKDKLYKMLTEIYEDTNFVKFVKVNLNRYLNFDAVF

333

366 KINIVPKVNYTYDGFENLRTNLNLANFNQONTNINNMNFTKL

375

378

terminus, and a cysteine, serine or threonine at its N-terminus, and a nucleophilic reagent able to cause cleavage of the intein to form a peptide bond between the extein C-terminus and synthetic peptide N-terminus through the formation of an activated ester or thio ester intermediate. (II) has antiinflammatory activity and prevents accumulation of pancreatic digestive enzymes, and prevents exocytic fusion of vesicles containing secretory enzymes of pancreas. (I) is useful for treating acute pancreatitis. The present sequence represents the Clostridium botulinum BoNT/A neurotoxin light chain prototoxin which is given in the exemplification of the present invention

XX Sequence 448 AA;

AAB24387 Length: 448 August 31, 2004 14:39 Type: P Check: 3349 ..
Found using 'seq23' (hayes346.key)

1 MPFVNQFNYKDPVNGVDIAYIKIPNAGQMPVKAFKIHKIWIPIERDFTTNPBGDLN
21 24

61 PPPEAKQVPVSYYD

...

135 INVIQDGSYRSEELNLVIIGPSADIIQPECKSFGEVNLTRNGYGTQYIRFSPDFTF
185

195 GFESLEVDNPLGAGKEATDPAVTLAHLIHAGHRLYGIALNPNRVKNTNAYEYMS
233 250

255 GLEVSFEELRTGGHDAKFDLSQENEFRLYYNKFQDIASLTINKAKSIVGTTASLQYMK
287

315 NVFKEKYLSEDTSGKFSVDKLFKDLKYLKMLEIYTEDNFVKEFKVLNKRKTYLNFDAKVF
342 366

375 KINIVPKVNTYIDGFNLRLNTNLAAFNQNTNINNNFTKLKNFTGLPEFYKLLCVRG
384 426

435 ITSQKSLDKGYNK

6 matches found in sequence:
aab36302; C. botulinum BoNT/A neurotoxin heavy chain prototoxin SEQ ID NO:8.
(from "bt_ags.pep")
TOIG of: aab36302 check: 5385 from: 1 to: 423

ID AAB36302 standard; protein; 423 AA.

XX AAB36302;

AC AAB36302;

DT 15-FEB-2001 (first entry)

DE C. botulinum BoNT/A neurotoxin heavy chain prototoxin SEQ ID NO:8.

XX Human; procholecystokinin; CCK A receptor; CCK B receptor; pancreatitis;
KW antiinflammatory.

OS Clostridium botulinum.

XX WO2000061192-A2.

PN 19-OCT-2000.

XX 06-APR-2000; 2000WO-US0009142.

08-APR-1999; 99US-00288326.

(ALLR) ALLERGAN SALES INC.

Steward LE, Sachs G, Aoki KR;

XX WPI; 2000-679416/86.

XX New composition for treating acute pancreatitis, comprises a pancreatic
PT cell surface marker binding element, a translocation element that
PT transfers polypeptide across vesicular membrane, and a therapeutic
PT element.

XX Disclosure; Page 28; 50pp; English.

XX The present invention describes a composition (I) for treating acute
CC pancreatitis. (I) comprises a first element containing a binding element
CC that binds to a pancreatic cell surface marker, a second element
CC containing a translocation element that facilitates polypeptide transfer
CC across the vesicular membrane, and a third element containing a
CC therapeutic element that inhibits enzyme secretion in pancreatic cell
CC cytoplasm. Also described is a method for making a therapeutic cell
CC polypeptide having a binding element selective for cholecystokinin (CCK)
CC receptor by expressing within a host cell a recombinant chimeric
CC polypeptide comprising an extein containing a therapeutic element and a
CC translocational element, and an intein located to the carboxy terminal of
CC extein having a cysteine, serine or threonine at its amino terminus, and
CC contacting the extein with a synthetic peptide comprising a CCK amino
CC acid sequence containing an amidated phenylalanine at a natural C-
CC terminus and a cysteine, serine or threonine at its N-terminus, and a
CC nucleophilic reagent able to cause cleavage of the intein to form a
CC peptide bond between the extein C-terminus and synthetic peptide N-
CC terminus through the formation of an activated ester or thio ester
CC intermediate. (I) has antiinflammatory activity and prevents accumulation
CC of pancreatic digestive enzymes, and prevents exocytic fusion of vesicles
CC containing secretory enzymes of pancreas. (I) is useful for treating
CC acute pancreatitis. The present sequence represents the Clostridium
CC botulinum BoNT/A neurotoxin heavy chain prototoxin which is given in the
CC exemplification of the present invention

XX Sequence 423 AA;

AAB36302 Length: 423 August 31, 2004 14:39 Type: P Check: 5385 ..
Found using 'seq23' (hayes346.key)

...

5 LCIKVNNWDLFFSPSDNFTNLDNKGEEITSDTNTAEENISLDLIQYYITFNFDPNP
55 58

65 ENISIENTSSDIIGLELMPNIERFPNGKKYELDKYTMFHYLRAQEFFEHGKSRIALTNSV
100 105

125 NEALLNPSRVYTFSSDYVKVKNKATEAAMFLGWVEQLVYDFTDETSEVSTTDKIADITI
135

185 IIPY

...

212 GAVILLEFIPEIPIVLGTFALVSYIANKVLTVQIDNLSKRNKNEKWEVYKIVTNWLA
262

272 KVNTQIDLIRKKWKEALENQAEATKAIINYQVNTYEBEKNNINFNIDDLSSKLNESINK
303

332 AMININKFLNQCSVSYLMSMIPYG

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13 matches found in sequence:
aab36303 ; BoNT/A prototoxin heavy chain C-terminal neural cell binding domain
(from "bt_ags.pep")
TOIG of: aab36303 check: 8367 from: 1 to: 382

ID AAB36303 standard; protein; 382 AA.
XX
AC AAB36303;
XX
DT 15-FEB-2001 (first entry)
XX
DE BoNT/A prototoxin heavy chain C-terminal neural cell binding domain.
XX
XX Human; procholecystokinin; CCK A receptor; CCK B receptor; pancreatitis;
XX antiinflammatory.
XX
OS Clostridium botulinum.
XX
XX WO200061192-A2.
XX
XX 19-OCT-2000.
XX
XX 06-APR-2000; 2000WO-US009142.
XX
XX 08-APR-1999; 99US-00288326.
XX
XX (ALLR ) ALLERGAN SALES INC.
XX
XX Steward LE, Sachs G, Aoki KR;
XX
XX WPI; 2000-679416/66.
XX
XX New composition for treating acute pancreatitis, comprises a pancreatic
XX cell surface marker binding element, a translocation element that
XX transfers polypeptide across vesicular membrane, and a therapeutic
XX element.
XX
XX Example 1; Page 29; 50pp; English.
XX
XX The present invention describes a composition (I) for treating acute
XX pancreatitis. (I) comprises a first element containing a binding element
XX that binds to a pancreatic cell surface marker, a second element
XX containing a translocation element that facilitates polypeptide transfer
XX across the vesicular membrane, and a third element containing a
XX therapeutic element that inhibits enzyme secretion in pancreatic cell
XX cytoplasm. Also described is a method for making a therapeutic
XX polypeptide having a binding element selective for cholecystokinin (CCK)
XX receptor by expressing within a host cell a recombinant chimeric
XX polypeptide comprising an extein containing a therapeutic element and a
XX translocational element, and an intein located to the carboxy terminal of
XX extein having a cysteine, serine or threonine at its amino terminus, and
XX contacting the extein with a synthetic peptide comprising a CCK amino
XX acid sequence containing an amidated phenylalanine at a natural C-
XX terminus, and a cysteine, serine or threonine at its N-terminus, and a
XX nucleophilic reagent able to cause cleavage of the intein to form a
XX peptide bond between the extein C-terminus and synthetic peptide N-
XX terminus through the formation of an activated ester or thio ester
XX intermediate. (I) has antiinflammatory activity and prevents accumulation
XX of pancreatic digestive enzymes, and prevents exocytic fusion of vesicles
XX containing secretory enzymes of pancreas. (I) is useful for treating
XX acute pancreatitis. The present sequence represents the Clostridium
XX botulinum BoNT/A prototoxin heavy chain C-terminal neural cell binding
XX domain, which is given in the exemplification of the present invention
XX
XX Sequence 382 AA;
XX
AAB36303 Length: 382 August 31, 2004 14:39 Type: P Check: 8367
Found using 'seq23' (hayes346.key)
|---|

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1 QLFNLESSKIEVLKNAIVNVMSEFSTFWIRIPKVFNISLNNXYTINCMMENNSGW
20 23 24 27 |---|
48 51
61 KVSINYEIITWLTQTOEIKQVVFVKYSOMINISDYINRWIFVTITNNRLNNSKIYNGR
66 69 |---|
87 90
121 LIDQKPIISNLGNHASNNIMFKLDGCRDTHRYIWKYFNLFDEKELNEKEIKDLYDNOSNS
152 157 |---|
181 GILKDFWGDLYQDKPYKYMNLNLYDPNKYVDVNNVGIRGYMKGKGRGVMVTNIYLNSSL
190 197 |---|
208 219
241 YRGTFIKKYGAGNKONIVRNDRVYINVVVKNKEKRYLATNASQAGVEKILSALEIPDV
267 277 |---|
301 GNLSQVVVMKSKNDQGITNKKOMLQDNNG
...
-----
24 matches found in sequence:
aae07900 ; C. botulinum C2 translocation domain with BoNT/F-binding domain #1.
(from "bt_ags.pep")
TOIG of: aae07900 check: 1789 from: 1 to: 1092

ID AAE07900 standard; protein; 1092 AA.
XX
AC AAE07900;
XX
DT 01-NOV-2001 (first entry)
XX
DE C. botulinum C2 translocation domain with BoNT/F-binding domain #1.
XX
XX Neuronal cell; binding domain; translocation domain; stroke; epilepsy;
XX tumour; infection; neurodegenerative disease; gene therapy;
XX botulinum neurotoxin type F; BoNT/F.
XX
XX Clostridium botulinum.
XX
XX WO200158936-A2.
XX
XX 16-AUG-2001.
XX
XX 04-DEC-2000; 2000WO-GB004644.
XX
XX 02-DEC-1999; 99GB-00028530.
XX
XX 07-APR-2000; 2000GB-00008658.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
XX Shone CC, Sutton JM, Silman N;
XX
XX WPI; 2001-514643/56.
XX
XX New non toxic polypeptide for delivery of a therapeutic agent for the
XX treatment of a CNS disorder comprising a binding domain that translocates
XX the therapeutic agent into the neuronal cells.
XX
XX Example 2; Page 47; 50pp; English.
XX
XX The invention relates to a non toxic polypeptide, for delivery of a
XX therapeutic agent to a neuronal cell, which comprises a binding domain
XX (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as
XX Hc) that binds to the neuronal cell and a translocation domain (amino
XX terminal half of HC, designated as HN), that translocates the therapeutic
XX agent into the neuronal cell, where the translocation domain is not a HN
XX domain of a clostridial neurotoxin and is not a fragment or derivative of

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AC AAB04096;
 XX 11-APR-2001 (first entry)
 DT Botulism toxin heavy chain C-terminal sequence (serotype F).
 DE Botulism toxin; neurotoxin; heavy chain; recombinant expression;
 KW recombinant vector; antigen; immune response; vaccine; bacterium;
 KW infection.
 XX Synthetic.
 OS Clostridium botulinum.
 XX WO200067700-A2.
 XX 16-NOV-2000.
 PD 12-MAY-2000; 2000WO-US012890.
 XX 12-MAY-1999; 99US-0133865P.
 PR 12-MAY-1999; 99US-0133866P.
 PR 12-MAY-1999; 99US-0133867P.
 PR 12-MAY-1999; 99US-0133868P.
 PR 12-MAY-1999; 99US-0133869P.
 PR 12-MAY-1999; 99US-0133873P.
 PR 29-JUL-1999; 99US-0146192P.
 XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 PA Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
 XX WPI; 2001-016048/02.
 DR N-PSDB; AAA54490.
 XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
 PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
 PT against botulism.
 XX Claim 3; Fig 9b; 73pp; English.
 PS Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
 XX and then posttranslationally nicked, forming a dichain consisting of a
 CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
 CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
 CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
 CC can be used in recombinant expression vectors and expressed in
 CC transformed cells to produce peptide antigens useful for eliciting an
 CC immune response to give protective immunity against botulinum neurotoxin,
 CC which causes botulism. The nucleic acids are expressible in a recombinant
 CC organisms such as Escherichia coli or Pichia pastoris. The use of
 CC recombinant nucleic acids are advantageous since it eliminates the need
 CC to culture large quantities of hazardous toxin-producing bacterium.
 CC Production yield from the genetically engineered product is also high and
 CC cost of production is lower. The nucleic acids can be derived from
 CC Clostridium botulinum serotypes A-G
 XX Sequence 432 AA;
 SQ AAB04096 Length: 432 August 31, 2004 14:39 Type: P Check: 8175 ..
 Found using 'seq23' (hayes346.key)

1 MSYTDNKILLYFNKLYKKIKDINSILDMRYENKPFIDISGYGSNISGNDVVIYSTNRNQ
 17 20

61 FGIYSKPEVNAQNNDIYNGRYQNFISFPWRIPKYFNKVNLNNEYTIIDCIRNNNS
 85 88

121 GWKISLNVNKKIIWTLODTAGNNQKLVFNVTOMISDSYINKWIFVTTNRLGNRIYIN
 128 149

181 GNLIDEKSIISNLGDIHVSDNLIKIVGCDNTRYVGIRYFKVFDTELKTEIETLYSDEPD
 213 218
 241 PSILKDFWGNVYLLNKRKYLLNLLRTDKSITONSFLNINQOQGVYQKKNIFSNTFLYTG
 251 258
 301 VEVIIKNGSSTDISNTDNFVRKNDLAYINVDVDRDVEYRLYADISIAKPEKIIKLIFTSNS
 327 340
 361 NNSLGQIIIVMDSIGNNCTMNFONNNGNIGLLGFHSHNNLVASSWYNNIRKNTSSNGCFW
 406
 421 SFISKEHGWQEN

 5 matches found in sequence:
 aab04097 : Botulism toxin heavy chain N-terminal sequence (serotype B).
 (from "bt_ags.pep")
 TOIG of: aab04097 check: 8861 from: 1 to: 413
 ID AAB04097 standard; protein; 413 AA.
 XX AC AAB04097;
 XX DT 11-APR-2001 (first entry)
 XX DE Botulism toxin heavy chain N-terminal sequence (serotype B).
 XX KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
 KW recombinant vector; antigen; immune response; vaccine; bacterium;
 XX infection.
 XX OS Synthetic.
 OS Clostridium botulinum.
 XX WO200067700-A2.
 PD 16-NOV-2000.
 XX 12-MAY-2000; 2000WO-US012890.
 XX 12-MAY-1999; 99US-0133865P.
 PR 12-MAY-1999; 99US-0133866P.
 PR 12-MAY-1999; 99US-0133867P.
 PR 12-MAY-1999; 99US-0133868P.
 PR 12-MAY-1999; 99US-0133869P.
 PR 12-MAY-1999; 99US-0133873P.
 PR 29-JUL-1999; 99US-0146192P.
 XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 PA Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
 XX WPI; 2001-016048/02.
 DR N-PSDB; AAA54493.
 XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
 PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
 PT against botulism.
 XX Claim 6; Fig 12b; 73pp; English.
 PS Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
 CC and then posttranslationally nicked, forming a dichain consisting of a
 CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
 CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
 CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
 CC can be used in recombinant expression vectors and expressed in
 CC transformed cells to produce peptide antigens useful for eliciting an
 CC immune response to give protective immunity against botulinum neurotoxin,
 CC which causes botulism. The nucleic acids are expressible in a recombinant
 CC organisms such as Escherichia coli or Pichia pastoris. The use of
 CC recombinant nucleic acids are advantageous since it eliminates the need
 CC to culture large quantities of hazardous toxin-producing bacterium.
 CC Production yield from the genetically engineered product is also high and
 CC cost of production is lower. The nucleic acids can be derived from
 CC Clostridium botulinum serotypes A-G
 XX Sequence 432 AA;
 SQ AAB04096 Length: 432 August 31, 2004 14:39 Type: P Check: 8175 ..
 Found using 'seq23' (hayes346.key)

CC Production yield from the genetically engineered product is also high and
 CC cost of production is lower. The nucleic acids can be derived from
 CC Clostridium botulinum serotypes A-G

XX Sequence 449 AA;

AA04094 Length: 449 August 31, 2004 14:39 Type: P Check: 2298 ..
 Found using 'seq23' (hayes346.key)

...

52 MRYKNDKYDVTSGYDSNININGDVYKPTKNQFGIYNDKLTNELNISQNDYIIYDNKYKN
 102 109

112 FSISFWWRIPNYDNKIWNVNNETIICMRDNNSGWKVSLNHNHETIWTLDQNAGINOKLIA
 112 134

172 FNYGNANGISDYINKWIFVTITNDRLGSKLYINGNLIDQKSIILNLGNIHVSDNLFKIV
 174

232 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNEPNTNLIKDFWGNVLLYDKKEYLLNLVLP
 235 243 276 283

292 NNFDRRKDSLTSLINNIRSTILLANRLYSIGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
 319 346

352 SKTHLFLPYADTATTNKEKTIKISSGNRFNQVVMNSVGNCTNMFKNNGNNGNIGLLGF

412 KADTVVASTWYTHMRDHTNSNGCFWNFISEHGWOEK
 423

12 matches found in sequence:
 aab04095 ; Botulism toxin heavy chain C-terminal sequence (serotype E).
 (from "bt ags.pep")
 TOIG of: aab04095 check: 8672 from: 1 to: 419

ID AAB04095 standard; protein; 419 AA.

XX AC AAB04095;

XX AC AAB04095;

DT 11-APR-2001 (first entry)

XX Botulism toxin heavy chain C-terminal sequence (serotype E).
 XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
 KW recombinant vector; antigen; immune response; vaccine; bacterium;
 KW infection.

XX Synthetic.

OS Clostridium botulinum.

XX WO2000067700-A2.

XX 16-NOV-2000.

PF 12-MAY-2000; 2000WO-US012890.

XX 12-MAY-1999; 99US-0133865P.

PR 12-MAY-1999; 99US-0133866P.

PR 12-MAY-1999; 99US-0133867P.

PR 12-MAY-1999; 99US-0133868P.

PR 12-MAY-1999; 99US-0133869P.

PR 12-MAY-1999; 99US-0133870P.

PR 29-JUL-1999; 99US-0146192P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;

WPI; 2001-016048/02.

N-PSDB; AAA54489.

New nucleic acids encoding the carboxy- or amino-terminal portions of the
 heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
 against botulism.

Disclosure; Fig 8; 73pp; English.

Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
 and then posttranslationally nicked, forming a dichain consisting of a
 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
 disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
 -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BONT)
 can be used in recombinant expression vectors and expressed in
 transformed cells to produce peptide antigens useful for eliciting an
 immune response to give protective immunity against botulinum neurotoxin,
 which causes botulism. The nucleic acids are expressible in a recombinant
 organisms such as Escherichia coli or Pichia pastoris. The use of
 recombinant nucleic acids are advantageous since it eliminates the need
 to culture large quantities of hazardous toxin-producing bacterium.
 CC production yield from the genetically engineered product is also high and
 CC cost of production is lower. The nucleic acids can be derived from
 CC Clostridium botulinum serotypes A-G

Sequence 419 AA;

AA04095 Length: 419 August 31, 2004 14:39 Type: P Check: 8672 ..
 Found using 'seq23' (hayes346.key)

...

22 MRYKNDKYDVTSGYDSNININGDVYKPTKNQFGIYNDKLTNELNISQNDYIIYDNKYKN
 72 75 79

82 FSISFWWRIPNYDNKIWNVNNETIICMRDNNSGWKVSLNHNHETIWTLDQNAGINOKLIA
 82 104

142 FNYGNANGISDYINKWIFVTITNDRLGSKLYINGNLIDQKSIILNLGNIHVSDNLFKIV
 144

202 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNEPNTNLIKDFWGNVLLYDKKEYLLNLVLP
 205 213 246 253

262 NNFDRRKDSLTSLINNIRSTILLANRLYSIGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
 289 316

322 SKTHLFLPYADTATTNKEKTIKISSGNRFNQVVMNSVGNCTNMFKNNGNNGNIGLLGF

382 KADTVVASTWYTHMRDHTNSNGCFWNFISEHGWOEK
 393

14 matches found in sequence:

aab04096 ; Botulism toxin heavy chain C-terminal sequence (serotype F).
 (from "bt ags.pep")

TOIG of: aab04096 check: 8175 from: 1 to: 432

ID AAB04096 standard; protein; 432 AA.

XX

OS Synthetic.
 XX WO200002524-A2.
 PN
 XX
 PD
 XX
 PF
 XX
 PP
 XX
 PR
 XX
 PT
 XX
 PS
 XX
 SQ
 AAY77135 Length: 440 August 31, 2004 14:39 Type: P Check: 6014
 Found using 'seq23' (hayes346.key)

1 MANKYNSEILANNIILNRYKNNLIDLSYGAKVEYDGVGLNDKNQFKLTSSANSKIRV
 37 40

61 TONQNIIFNSVELDFSVFWIRIPKYNKNGIONYIHNEYTIINCMKNNGSWKISIRGNRI
 99 102

121 IWTLLIDNGKTSVFFVEYNIREIDSEYINRW

157 TNNLNNAKIYINGKLESNTDIKDIREVIANGELIIFKLDGIDRTQFIWMKYPSIFNTELS
 207

217 QSNIEERYKIQSYEYLKDFWGNPLMYKNYKNEFYFAGNKNYSYIKLKDKSPVGEILTRSKY
 229 247 258

OS The invention relates to novel vaccines that induce a protective immune response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant DNA construct comprising a vector, and at least one nucleic acid fragment comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-G. In preferred embodiments of the invention, the vector is a Venezuelan equine encephalitis virus (VEE) replicon vector. Use of this vector results in the production of large amounts of a protein encoded by a sequence cloned into the replicon. The constructs are used to produce vaccines against botulism. The proteins can also be used as diagnostic tools for the diagnosis of botulism. The transformed host cells can be used to analyse the effectiveness of drugs and agents which inhibit toxin effects. The vaccine currently used against botulism is dangerous and expensive to produce, and contains formalin, which is very painful for the recipient. Also, the vaccine is incomplete, in that only 5 of the 7 serotypes are represented in the formulation. The novel vaccine of overcomes these problems, as it is easily purified, and available in large quantities. It is also expressed in the lymph nodes for a better immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc fragments used in the present invention. The DNA encoding these sequences had been optimised for codon usage for expression in yeast. Note: This sequence is not given in the specification, but is decoded from the BoNTB Hc DNA sequence given on pages 39-40

Sequence 440 AA;

277 NONSKYINRYDLVIGEKFIIRKNSQSINDDIVRKEDYIYLDFFNLQBWRYVTKYKF
 282 285 315 332

337 KEEKLFLAPISDSDELNTIQIKEYDEQTYSCQLLFKKDEESTDEIGLIGHRFYEG
 354

397 IVFEYKDYFCISKWYKVKRKPYNLKLGCNWQFIPKDEGWTE
 402 405

 13 matches found in sequence:
 aay77136 ; Synthetic botulinum neurotoxin serotype C (BoNTC) C-terminal fragment
 (from "bt_ags.pep")
 TOIG of: aay77136 check: 8215 from: 1 to: 450

ID AAY77136 standard; protein; 450 AA.
 XX
 AC AAY77136;
 XX
 DT 08-MAY-2000 (first entry)
 XX
 DE Synthetic botulinum neurotoxin serotype C (BoNTC) C-terminal fragment.
 XX
 KW Botulinum neurotoxin; heavy chain; BoNT; serotype C; C-terminal fragment;
 KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
 XX diagnosis; drug screening.
 OS Clostridium botulinum.
 OS Synthetic.
 XX WO200002524-A2.
 XX
 PD 20-JAN-2000.
 XX
 PF 09-JUL-1999; 99WO-US015570.
 XX
 PR 10-JUL-1998; 98US-0092416P.
 PR 12-MAY-1999; 99US-0133870P.
 XX
 PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
 XX
 PI Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
 XX WPI; 2000-160827/14.
 DR N-PSDB; AAZ87214.
 XX
 PT Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
 PT toxin serotypes A-G, is used for inducing an immune response against
 PT botulinum.
 XX
 PS Claim 24; Page 41-42; 54pp; English.
 XX
 CC The invention relates to novel vaccines that induce a protective immune
 CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
 CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
 CC DNA construct comprising a vector, and at least one nucleic acid fragment
 CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
 CC G. In preferred embodiments of the invention, the vector is a Venezuelan
 CC equine encephalitis virus (VEE) replicon vector. Use of this vector
 CC results in the production of large amounts of a protein encoded by a
 CC sequence cloned into the replicon. The constructs are used to produce
 CC vaccines against botulism. The proteins can also be used as diagnostic
 CC tools for the diagnosis of botulism. The transformed host cells can be
 CC used to analyse the effectiveness of drugs and agents which inhibit toxin
 CC effects. The vaccine currently used against botulism is dangerous and
 CC expensive to produce, and contains formalin, which is very painful for
 CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
 CC serotypes are represented in the formulation. The novel vaccine of
 CC overcomes these problems, as it is easily purified, and available in
 CC large quantities. It is also expressed in the lymph nodes for a better
 CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
 CC fragments used in the present invention. The DNA encoding these sequences
 CC had been optimised for codon usage for expression in yeast. Note: This
 CC sequence is not given in the specification, but is decoded from the BoNTB
 CC Hc DNA sequence given on pages 39-40

CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 254 AA;

AAV30123 Length: 254 August 31, 2004 14:39 Type: P Check: 7711 ..
Found using 'seq23' (hayes346.key)

66 GLEWIGRIDPANGTEYDKPQKATITADTSSNTVNQLSLTSEDYAVYYCASGGELG
116
|---|

126 FPYWGQGLTVTSAAKTTPSPVPLAPGSAQAQTNMVTGLCLVRKGYFPEPVTVTNNGSL
148
|---|

186 SSGVHTFPVQLSDLY

13 matches found in sequence:
aay77134 ; Synthetic botulinum neurotoxin serotype A (BoNTA) C-terminal fragment
(from "bt_ags.pep")
TOIG of: aay77134 check: 1315 from: 1 to: 438

ID AAY77134 standard; protein; 438 AA.
XX
AC AAY77134;
DT 08-MAY-2000 (first entry)
XX
DE Synthetic botulinum neurotoxin serotype A (BoNTA) C-terminal fragment.
XX
KW Botulinum neurotoxin; heavy chain; BoNT; serotype A; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
KW diagnosis; drug screening.
XX
OS Clostridium botulinum.
OS Synthetic.
XX
PN WO200002524-A2.
XX
XX 20-JAN-2000.
XX
XX 09-JUL-1999; 99WO-US015570.
XX
PR 10-JUL-1998; 98US-0092416P.
PR 12-MAY-1999; 99US-0133870P.
XX
PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX N-PSDB; AAZ87212.
XX
PT Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
PT toxin serotypes A-G, is used for inducing an immune response against
PT botulinum.
XX
PS Claim 22; Page 54; 54pp; English.
XX
CC The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-

CC In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast
XX
SQ Sequence 438 AA;

AAV77134 Length: 438 August 31, 2004 14:39 Type: P Check: 1315 ..
Found using 'seq23' (hayes346.key)

...

26 ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVLKNAIVNMSYNEFST
76 79
|---| |---| |---|

86 SFWIRIPKYFNSISLNNEYTTIINCMMENNSGWKVSINYGELIWTLQDTQEIQRVVFYKYSQ
104 122
|---| |---| |---|

146 MINISDYINRWIFVTITNRLNLSKIYINGRLIDQKIPISNLGNHASNIMFKLDGCRDT
146
|---| |---| |---| |---| |---|

206 HRYTWIKYFNLFDKELNEKEIKDLYDNQNSGILKDFWGDLYDKPYMLNLYDPNKYV
208 213 246 253 264
|---| |---| |---| |---|

266 DVNNVGIRGYMYLXGPRGSVMTTNIYLNLSLYRGTKFIKKYASGNKONIVRNNDRVTIN
267 275
|---| |---|

326 VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVMKSKNDQGITNKCKMQLDNN
326 333
|---| |---|

386 G

..;

14 matches found in sequence:
aay77135 ; Synthetic botulinum neurotoxin serotype B (BoNTB) C-terminal fragment
(from "bt_ags.pep")
TOIG of: aay77135 check: 6014 from: 1 to: 440

ID AAY77135 standard; protein; 440 AA.

XX AC AAY77135;

XX DT 08-MAY-2000 (first entry)

XX DE Synthetic botulinum neurotoxin serotype B (BoNTB) C-terminal fragment.

XX KW Botulinum neurotoxin; heavy chain; BoNT; serotype B; C-terminal fragment;
XX KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
XX KW diagnosis; drug screening.

XX OS Clostridium botulinum.

CC can be used in recombinant expression vectors and expressed in
 CC transformed cells to produce peptide antigens useful for eliciting an
 CC immune response to give protective immunity against botulinum neurotoxin,
 CC which causes botulism. The nucleic acids are expressible in a recombinant
 CC organisms such as *Escherichia coli* or *Pichia pastoris*. The use of
 CC recombinant nucleic acids are advantageous since it eliminates the need
 CC to culture large quantities of hazardous toxin-producing bacterium.
 CC Production yield from the genetically engineered product is also high and
 CC cost of production is lower. The nucleic acids can be derived from
 CC Clostridium botulinum serotypes A-G
 XX
 SQ Sequence 413 AA;

AAB04097 Length: 413 August 31, 2004 14:39 Type: P Check: 8861 ..
 Found using 'seq23' (hayes346.key)

...
 80 VYKQPAKKIFTDENTIFQYLSQTFPLDIRDLSLTSSFDALLFSNKVYSFESMDYIK
 130

140 TANKVEAGLFAGVVKQVINDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF
 183

200 ENAFETAGASILLEFIPELLIPVVGAFLLSYIDNKNKIITIDNALTCKRKNWSDMYGL
 257

260 IVAQWLSTVNTQFYTIKGYKALNYQAQALEEIIKYRNYIYSEKEKSNINIDFNDSK
 280

320 LNEGINQAINNFINFGCSVSLMKKNIPLA

...

 8 matches found in sequence:
 aab04098 ; Botulism toxin heavy chain N-terminal sequence (serotype C).
 (from "Bt_ags.pep")
 TOIG of: aab04098 check: 8744 from: 1 to: 399

ID AAB04098 standard; protein; 399 AA.

AC AAB04098;

XX 11-APR-2001 (first entry)

DE Botulism toxin heavy chain N-terminal sequence (serotype C).

KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
 KW recombinant vector; antigen; immune response; vaccine; bacterium;
 KW infection.

XX Synthetic.

OS Clostridium botulinum.

XX WO2000067700-A2.

XX 16-NOV-2000.

XX 12-MAY-2000; 2000WO-US012890.

XX 12-MAY-1999; 99US-013386SP.

PR 12-MAY-1999; 99US-0133866P.

PR 12-MAY-1999; 99US-0133867P.

PR 12-MAY-1999; 99US-0133868P.

PR 12-MAY-1999; 99US-0133869P.

PR 12-MAY-1999; 99US-0133873P.

XX 29-JUL-1999; 99US-0146192P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;

WPI; 2001-016048/02.

N-PSDB; AAA54494.

New nucleic acids encoding the carboxy- or amino-terminal portions of the
 heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
 against botulism.

Claim 6; Fig 13b; 73pp; English.

Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
 and then posttranslationally nicked, forming a dichain consisting of a
 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
 disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
 -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
 can be used in recombinant expression vectors and expressed in
 transformed cells to produce peptide antigens useful for eliciting an
 immune response to give protective immunity against botulinum neurotoxin,
 which causes botulism. The nucleic acids are expressible in a recombinant
 organisms such as *Escherichia coli* or *Pichia pastoris*. The use of
 recombinant nucleic acids are advantageous since it eliminates the need
 to culture large quantities of hazardous toxin-producing bacterium.
 Production yield from the genetically engineered product is also high and
 cost of production is lower. The nucleic acids can be derived from
 Clostridium botulinum serotypes A-G

SQ Sequence 399 AA;

AAB04098 Length: 399 August 31, 2004 14:39 Type: P Check: 8744 ..
 Found using 'seq23' (hayes346.key)

...

23 IGDISDVKTDFILRKDINEETEVIYYPDVSVDQVILSKNTSEHGQDLILYPSIDSESEI
 73 76

83 LFCQGVFYDNRQTQVYDLYNSYYLESQKLSNDVEDFTFTRISIEALDNSAKVYTFPTL
 104

143 ANKNAGVQGLFWANDVVEDFTTNILRKDTLDKISDVSAIIPYIGFALNLSVRRG

203 NFTEAPVGTGVTILLLEAPPEFTIPALGAFVYSKVQERNEIITKIDNCLEQRIKRWKDSY
 234

263 EWMGTLSRIITQFNNSIYQMYDSLNYQAGAKAKIDLEVKYKSGDKENIKSQVENLK
 265 282 303

323 NSLDVKISEAMNNINKFIRECSVTYLFKNMLPKV

...

 9 matches found in sequence:
 aab04099 ; Botulism toxin heavy chain N-terminal sequence (serotype D).
 (from "Bt_ags.pep")
 TOIG of: aab04099 check: 4483 from: 1 to: 386

ID AAB04099 standard; protein; 386 AA.

XX AAB04099;

AC AAB04099;

XX 11-APR-2001 (first entry)

DE Botulism toxin heavy chain N-terminal sequence (serotype D).

```

XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX Synthetic.
OS Clostridium botulinum.
XX
XX WO200067700-A2.
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
XX 12-MAY-1999; 99US-0133865P.
XX
XX 12-MAY-1999; 99US-0133866P.
XX
XX 12-MAY-1999; 99US-0133867P.
XX
XX 12-MAY-1999; 99US-0133868P.
XX
XX 12-MAY-1999; 99US-0133869P.
XX
XX 12-MAY-1999; 99US-0133873P.
XX
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI
XX
XX WPI; 2001-016048/02.
XX
XX N-PSDB; AAA54495.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Claim 6; Fig 14b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
XX and then posttranslationally nicked, forming a dichain consisting of a
XX 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
XX can be used in recombinant expression vectors and expressed in
XX transformed cells to produce peptide antigens useful for eliciting an
XX immune response to give protective immunity against botulinum neurotoxin,
XX which causes botulism. The nucleic acids are expressible in a recombinant
XX organisms such as Escherichia coli or Pichia pastoris. The use of
XX recombinant nucleic acids are advantageous since it eliminates the need
XX to culture large quantities of hazardous toxin-producing bacterium.
XX Production yield from the genetically engineered product is also high and
XX cost of production is lower. The nucleic acids can be derived from
XX Clostridium botulinum serotypes A-G
XX
XX Sequence 386 AA;
AA04099 Length: 386 August 31, 2004 14:39 Type: P Check: 4483
Found using 'seq23' (hayes346.key)
...
40 ETVQVNSDKFSLDESILDQVPIINPEIVDPLLPVNNMEPLNPGEEIVFYDDITKYVDY
|---| |---| |---|
90 93 96 99
100 LNSYYLSEQKLSNNVENITLTSVEALGYSNKIYTFPLPSLAEKNKGQVAGFLNWNAN
|---| |---|
103
160 EVVEDFTTNMKKDTLKDSDSVIIPYICPALNIGNSALRGNFQAFATAGVAFLEGF
|---|
220 PEFTIPALGVFTFYSGIQEREKIITKIENCLEQRVKRWKDSYQMVSNWLSRITTFQNH
|---|
233
261
|---|

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|---| |---|
280 NYQWYDLSLQYQADAIKAKIDLEYKYSKSGDKENIKSQVENLKNSLDVKISEAMNNINKFI
281 302
284
340 RECSVTYLFXKMLPKV
...
6 matches found in sequence:
aab04100 ; Botulism toxin heavy chain N-terminal sequence (serotype E).
(from "bt_ags.pep")
TOIG of: aab04100 check: 1971 from: 1 to: 382

ID AAB04100 standard; protein; 382 AA.
XX
XX AC
XX AAB04100;
XX
XX 11-APR-2001 (first entry)
XX
XX Botulism toxin heavy chain N-terminal sequence (serotype E).
XX
XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX Synthetic.
OS Clostridium botulinum.
XX
XX WO200067700-A2.
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
XX 12-MAY-1999; 99US-0133865P.
XX
XX 12-MAY-1999; 99US-0133866P.
XX
XX 12-MAY-1999; 99US-0133867P.
XX
XX 12-MAY-1999; 99US-0133868P.
XX
XX 12-MAY-1999; 99US-0133869P.
XX
XX 12-MAY-1999; 99US-0133873P.
XX
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI
XX
XX WPI; 2001-016048/02.
XX
XX N-PSDB; AAA54496.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Claim 6; Fig 15b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
XX and then posttranslationally nicked, forming a dichain consisting of a
XX 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
XX can be used in recombinant expression vectors and expressed in
XX transformed cells to produce peptide antigens useful for eliciting an
XX immune response to give protective immunity against botulinum neurotoxin,
XX which causes botulism. The nucleic acids are expressible in a recombinant
XX organisms such as Escherichia coli or Pichia pastoris. The use of
XX recombinant nucleic acids are advantageous since it eliminates the need
XX to culture large quantities of hazardous toxin-producing bacterium.
XX Production yield from the genetically engineered product is also high and
XX cost of production is lower. The nucleic acids can be derived from
XX Clostridium botulinum serotypes A-G
XX
XX

```


CC botulinum toxins in food and are also useful in health care and in
 CC military applications. They are less expensive to produce than monoclonal
 CC antibodies as they can be isolated from large scale bacterial cultures.
 CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
 CC and subsequent screening of the expressed rFabs
 XX
 SQ Sequence 254 AA;
 AAY30119 Length: 254 August 31, 2004 14:39 Type: P Check: 7873 ..
 Found using 'seq23' (hayes346.key)
 ...
 66 GLEWIGRIDPANGNTEYDFKFOQKAITADTSSNTVNLQLSSLTSETAVYYCAGSGELG
 116
 126 FPYWGQGLVTVSAAKTTTPSVVPLAPGSAAQTNMVTGLCLVKGYFPEPVTVTWNSGSL
 148
 186 SSGVHTFPVAVLDYLTGLSSSVTPSPSTWPFSETVTCNVAHPASSTKVDKIIVPRDCTSGG
 198
 246 GGSHHH
 ...

 1 match found in sequence:
 aay30120 ; Murine anti-botulinum toxin antibody fragment (BotFab 20) light cha
 (from "bt_ags.pep")
 TOIG of: aay30120 check: 4781 from: 1 to: 236
 ID AAY30120 standard; protein; 236 AA.
 XX
 AC AAY30120;
 XX
 DT 20-OCT-1999 (first entry)
 DE Murine anti-botulinum toxin antibody fragment (BotFab 20) light chain.
 XX
 KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
 KW Clostridium botulinum; detection.
 XX
 OS Mus musculus.
 XX
 PN US5932449-A.
 XX
 PD 03-AUG-1999.
 XX
 PF 30-JAN-1997; 97US-00792824.
 XX
 PR 01-FEB-1996; 96US-0011013P.
 XX
 PA (USSA) US SEC OF ARMY.
 XX
 PI Burans JP, Emanuel PA, Valdes JU, Eldefrawi ME;
 XX
 DR WPI; 1999-492692/41.
 DR N-PSDB; AAX86666.
 XX
 PT Detection of botulinum toxin.
 PS Claim 15; Col 31-34; 24pp; English.
 XX
 CC This sequence represents the light chain of BotFab 20, a murine
 CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
 CC and B. A cDNA library was made from mouse mRNA isolated from mice
 CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
 CC chains were expressed in phage display libraries and screened for their
 CC ability to bind to botulinum toxin types A or B. The clones were then
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC with non-neurotoxic proteins. The rFab of this invention binds to the non

CC isolated and sequenced. Botulinum neurotoxin is produced as several
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC with non-neurotoxic proteins. The rFab of this invention binds to the non
 CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting
 CC botulinum toxins in food and are also useful in health care and in
 CC military applications. They are less expensive to produce than monoclonal
 CC antibodies as they can be isolated from large scale bacterial cultures.
 CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
 CC and subsequent screening of the expressed rFabs
 XX
 SQ Sequence 236 AA;
 AAY30120 Length: 236 August 31, 2004 14:39 Type: P Check: 4781 ..
 Found using 'seq23' (hayes346.key)
 ...
 4 LUPTAAGLLLLAAQPAMADIQWQSPASLSASVGETVITCRASGNHNYLAWYQKQKQ
 54 57
 64 KSPQLLVYNAKTLADGVPSRFSGSGSGTQYSLKINSIQPEDFGS
 ...

 2 matches found in sequence:
 aay30121 ; Murine anti-botulinum toxin antibody fragment (BotFab 20) heavy cha
 (from "bt_ags.pep")
 TOIG of: aay30121 check: 7921 from: 1 to: 254
 ID AAY30121 standard; protein; 254 AA.
 XX
 AC AAY30121;
 XX
 DT 20-OCT-1999 (first entry)
 DE Murine anti-botulinum toxin antibody fragment (BotFab 20) heavy chain.
 XX
 KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
 KW Clostridium botulinum; detection.
 XX
 OS Mus musculus.
 XX
 PN US5932449-A.
 XX
 PD 03-AUG-1999.
 XX
 PF 30-JAN-1997; 97US-00792824.
 XX
 PR 01-FEB-1996; 96US-0011013P.
 XX
 PA (USSA) US SEC OF ARMY.
 XX
 PI Burans JP, Emanuel PA, Valdes JU, Eldefrawi ME;
 XX
 DR WPI; 1999-492692/41.
 DR N-PSDB; AAX86666.
 XX
 PT Detection of botulinum toxin.
 PS Claim 15; Col 33-36; 24pp; English.
 XX
 CC This sequence represents the heavy chain of BotFab 20, a murine
 CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
 CC and B. A cDNA library was made from mouse mRNA isolated from mice
 CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
 CC chains were expressed in phage display libraries and screened for their
 CC ability to bind to botulinum toxin types A or B. The clones were then
 CC isolated and sequenced. Botulinum neurotoxin is produced as several
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC with non-neurotoxic proteins. The rFab of this invention binds to the non

CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting
 CC botulinum toxins in food and are also useful in health care and in
 CC military applications. They are less expensive to produce than monoclonal
 CC antibodies as they can be isolated from large scale bacterial cultures.
 CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
 CC and subsequent screening of the expressed rFabs
 XX
 SQ Sequence 254 AA;

AAAY30121 Length: 254 August 31, 2004 14:39 Type: P Check: 7921 ..
 Found using 'seq23' (hayes346.key)

...

66 GLEWIGRIDPANGNTEYDKPRFQGRATITADTSTNTVNLQLSLTSEDTAVYCSGGGELG
 |--|
 116

126 FFWGQGLTVTSNAKTTPSPVPLAAGSRAQTNSMTVLGLVKGYFPEPVVTWNSGL
 |--|
 148

186 SSGVHTFPVQLQSDLY

...

 1 match found in sequence:

aay30122 ; Murine anti-botulinum toxin antibody fragment (BotFab 22) light cha
 (from "bt_ags.pep")
 TOIG of: aay30122 check: 4781 from: 1 to: 236

ID AAY30122 standard; protein; 236 AA.

XX
 AC AAY30122;

XX
 DT 20-OCT-1999 (first entry)

XX Murine anti-botulinum toxin antibody fragment (BotFab 22) light chain.

XX Recombinant antibody fragment; rFab; botulinum; neurotoxin;

KW Clostridium botulinum; detection.

XX Mus musculus.

XX US5932449-A.

PN 03-AUG-1999.

XX 30-JAN-1997; 97US-00792824.

XX 01-FEB-1996; 96US-0011013P.

XX (USSA) US SEC OF ARMY.

XX Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;

XX WPI; 1999-492692/41.

DR N-PSDB; AAX86667.

XX Detection of botulinum toxin.

XX Claim 25; Col 39-40; 24pp; English.

XX This sequence represents the light chain of BotFab 22, a murine
 CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
 CC and B. A cDNA library was made from mouse mRNA isolated from mice
 CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
 CC chains were expressed in phage display libraries and screened for their
 CC ability to bind to botulinum toxin types A or B. The clones were then
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC isolated and sequenced. Botulinum neurotoxin is produced as several
 CC

CC with non-neurotoxic proteins. The rFab of this invention binds to the non
 CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting
 CC botulinum toxins in food and are also useful in health care and in
 CC military applications. They are less expensive to produce than monoclonal
 CC antibodies as they can be isolated from large scale bacterial
 CC cultures. Also, the affinity of an rFab may be altered by mutagenesis of
 CC its gene and subsequent screening of the expressed rFabs
 XX
 SQ Sequence 236 AA;

AAAY30122 Length: 236 August 31, 2004 14:39 Type: P Check: 4781 ..
 Found using 'seq23' (hayes346.key)

...

4 LLPTAAAGLLLLAAQPAADIQMTQSPASLSASVGETVTITCRASGNIHNYLAWYQKQKQ
 |--|
 54 57

64 KSPQLLYNAKTLADGVPSRFSGSGSGTQYSLKINSIQPEDFGS

...

 2 matches found in sequence:

aay30123 ; Murine anti-botulinum toxin antibody fragment (BotFab 22) heavy cha
 (from "bt_ags.pep")

TOIG of: aay30123 check: 7711 from: 1 to: 254

ID AAY30123 standard; protein; 254 AA.

XX
 AC AAY30123;

XX 20-OCT-1999 (first entry)

XX Murine anti-botulinum toxin antibody fragment (BotFab 22) heavy chain.

XX Recombinant antibody fragment; rFab; botulinum; neurotoxin;

KW Clostridium botulinum; detection.

XX Mus musculus.

XX US5932449-A.

XX 03-AUG-1999.

XX 30-JAN-1997; 97US-00792824.

XX 01-FEB-1996; 96US-0011013P.

XX (USSA) US SEC OF ARMY.

XX Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;

XX WPI; 1999-492692/41.

DR N-PSDB; AAX86667.

XX Detection of botulinum toxin.

XX Claim 22; Col 41-42; 24pp; English.

XX This sequence represents the heavy chain of BotFab 22, a murine
 CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
 CC and B. A cDNA library was made from mouse mRNA isolated from mice
 CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
 CC chains were expressed in phage display libraries and screened for their
 CC ability to bind to botulinum toxin types A or B. The clones were then
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC with non-neurotoxic proteins. The rFab of this invention binds to the non
 CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting

```
> O <
O | | O IntelliGenetics
> O <

Quest - Quick User-directed Expression Search Tool
Release 5.4

-- Outline of search "seq23ags" --

Selected search type is key against sequence data banks or files.
Selected scope is Sequence.
Selected sequence key from "hayes346.key":
seq23 (AA) ID seq23 AA preliminary pattern
1 followed by
2 y
2 any character
2 any character
2 1 or i or m or a or f or w or v or y

Selected files:
File : bt_ags.pep

-- Output Parameters --

Format Options:
Nucleic acid code matching Exact Indirect file
Find non-matching hits only No Sequence or key file
Report key used Yes List of hits
Note position of hit Yes Hit display
Display full annotations Yes Name and annotations
Sequence context 50

No
No
Yes
Yes
Yes
Yes

21 matches found in sequence:
aab04081; Botulinum toxin heavy chain (serotype A).
(from "bt_ags.pep")
TOIG of: aab04081 check: 1164 from: 1 to: 847

ID AAB04081 standard; protein; 847 AA.
XX
AC AAB04081;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulinum toxin heavy chain (serotype A).
XX
KW Botulinum; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Clostridium botulinum.
XX
FH Key Location/Qualifiers
FT Misc-difference 821
FT /note= "Gly or Arg"
XX
PN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX WPI; 2001-016048/02.
XX
PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Disclosure; Page 12; 73pp; English.
XX
CC Botulinum neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
SQ Sequence 847 AA;

AAB04081 Length: 847 August 31, 2004 14:39 Type: P Check: 1164 ..
Found using 'seq23' (hayes346.key)

...

5 LCIKVNNWDLFFSPSEDNFTNDLNGKEITSDINIEAAEENISLDLIQQVYLTFFDNEP
55 58
65 ENISTENLSSDIIGQLELMPNIERPFGKGYELDKYTMFHYLRAQEFHGKSRIALTNSV
100 105
125 NEALLNPSRVYTFSSDYVKVKNKATEAAMFLGWVEQLVYDFDTESEVSTTDKIADITI
135
185 IIPY
...
211 GAVILLEFIPETAIPLVLTGTFALVSYIANKVLTVQTIDNALSKRNEKWDVYKYIVTNWLA
261
271 KVTQTDLIRKKMKEALENQAEATKAIINYQNYQYTEEKKNINFINIDLSKLNESINK
302
331 AMININKELNQCSVSYLMNSMIPYGVKRLDFDASLKDALLKYIRDNYGTGLIQVDRLKD
378
391 KVNNTLSTDIPFQLSKYVDNQRLSLTFTTEYIKNIINTSILN
...
|---|
```

| | | |
|---|---|---------------------|
| 435 | ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLENLESSKIEVILKNAIVVNSMVENPST | 485 489 |
| 495 | SWTIRIPKYFNSISLNNEYTTINCMMENNSGWKSVLSNYGEIITWLTQTOEIKQRVVFKYSQ | 513 531 552 |
| 555 | MINISDYINRWIFVTITNRLNNSKIYTINGRLIDQKPFISNLGNIHASNIMFKLDGCRD | 555 |
| 615 | THRYIWKYFNLPDKELNEKEIKDIYDQNSGILKDPWG DYLOYDKFYVMILLYDPNKY | 618 623 656 663 674 |
| 675 | VDVNVGIRGYMYLKGPRGSVMTTNIYVLSLYRGTKFIKKASGNKDNIVRNDRVVIN | 677 685 732 |
| 735 | VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKRMNLQDNN | 735 742 |
| 795 | G | |
| ... | | |
| ----- | | |
| 17 matches found in sequence: | | |
| aab04082 ; Botulism toxin heavy chain (serotype B). | | |
| (from "bt_ags pep") | | |
| TOIG of: aab04082 check: 6439 from: 1 to: 848 | | |
| ID AAB04082 standard; protein; 848 AA. | | |
| XX | AAB04082; | |
| AC | | |
| XX | | |
| DT | 11-APR-2001 (first entry) | |
| XX | | |
| DE | Botulism toxin heavy chain (serotype B). | |
| XX | | |
| KW | Botulism; toxin; neurotoxin; heavy chain; recombinant expression; | |
| KW | recombinant vector; antigen; immune response; vaccine; bacterium; | |
| KW | infection. | |
| XX | | |
| OS | Clostridium botulinum. | |
| XX | | |
| PN | WC2000067700-A2. | |
| XX | | |
| PD | 16-NOV-2000. | |
| XX | | |
| PF | 12-MAY-2000; 2000WO-US012890. | |
| XX | | |
| PR | 12-MAY-1999; 99US-0133865P. | |
| PR | 12-MAY-1999; 99US-0133866P. | |
| PR | 12-MAY-1999; 99US-0133867P. | |
| PR | 12-MAY-1999; 99US-0133868P. | |
| PR | 12-MAY-1999; 99US-0133869P. | |
| PR | 12-MAY-1999; 99US-0133873P. | |
| PR | 29-JUL-1999; 99US-0146192P. | |
| XX | | |
| PA | (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND. | |
| XX | | |
| PI | Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H; | |
| XX | | |
| DR | WPI; 2001-016048/02. | |
| XX | | |
| PT | New nucleic acids encoding the carboxy- or amino-terminal portions of the | |
| PT | heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine | |

| | | |
|---|---|-------------|
| PT | against botulism. | |
| XX | | |
| PS | Disclosure; Page 13; 73pp; English. | |
| XX | | |
| CC | Botulism neurotoxins are translated as a single 150 kDa polypeptide chain | |
| CC | and then posttranslationally nicked, forming a dichain consisting of a | |
| CC | 100 kDa heavy chain and a 50 kDa light chain which remain linked by a | |
| CC | disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino | |
| CC | -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT) | |
| CC | can be used in recombinant expression vectors and expressed in | |
| CC | transformed cells to produce peptide antigens useful for eliciting an | |
| CC | immune response to give protective immunity against botulinum neurotoxin, | |
| CC | which causes botulism. The nucleic acids are expressible in a recombinant | |
| CC | organisms such as Escherichia coli or Pichia pastoris. The use of | |
| CC | recombinant nucleic acids are advantageous since it eliminates the need | |
| CC | to culture large quantities of hazardous toxin-producing bacterium. | |
| CC | Production yield from the genetically engineered product is also high and | |
| CC | cost of production is lower. The nucleic acids can be derived from | |
| CC | Clostridium botulinum serotypes A-G | |
| XX | | |
| XX | Sequence 848 AA; | |
| SQ | | |
| AAB04082 Length: 848 August 31, 2004 14:39 Type: P Check: 6439 .. | | |
| Found using 'seq23' (hayes346.key) | | |
| ... | | |
| 79 | VYEQPAIKKIFTDENTIFQYLYSQTFPLDIRDISLTSSFDALLFSNKVYVSPFMDYIK | 129 |
| 139 | TANKVVEAGLFAGWVKQIVNDFVIEANKSNTMKIADISLIVPYIGLALNVGNETAKGNF | 182 |
| 199 | ENAFETAGASILLEFPELLIPVVGAFLESYIDNKNKIITIDNALTNRNEKWSMDMYGL | 256 |
| 259 | IVAOWLSTVNTQFTYIKEGMYKALNYQAQALEELIKYRYNIYSEKEKSNNIDNFNDSK | 279 |
| 319 | LNEGINQAINNNFNGSCSVILMKMKIPLA | 297 |
| ... | | |
| 397 | FDSLITYNTDTILIEFMFNKYNSEILNIIILNRYKDNLLIDLSGYAKVYVDGVDELNKN | 447 |
| 457 | QPKLTSSANSKIRTTQNIIIFNSVFLDFSVFWIRIPKYNDGIQNYIHNEYTIINCMK | 509 |
| 517 | NNSGWKISIRGRIITWLTIDINGKTKSVFFEYNIREDISEYINRWFF | |
| ... | | |
| 566 | TNNLNNAKIYINGKLESNTDIKDIREVIANGELIFKLDGDIIDRTQPTIMMKYFISFNTELS | 616 |
| 626 | QSNIEERYKIQSYSEYILKDPWGNPLMYNKEYYMFNAGKNKSYTIKLKDSFVGEILTRSK | 656 |
| 686 | YNQNSKYINRYDLYIGEKFTIRKNSNSQSINDDIVRKEDYIYLDFFNLNQEWRYVTKYF | 692 725 727 |

```
746 KKEELFLAPISDSDEFNTIQIKEYDEQTYSCQLLFKKDEESTDEIGLIGHRPYESG
      |---|
      763
806 IVFEVKDVCISDWYLEVKRPYNLKLSCNQFIPKDRGWT
      |---|
      821

-----
13 matches found in sequence:
aab04083 ; Botulinum toxin C fragment sequence (serotype A).
(from "bt_ags.pep")
TOIG of: aab04083 check: 3256 from: 1 to: 415

ID AAB04083 standard; protein; 415 AA.
XX
AC AAB04083;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulinum toxin C fragment sequence (serotype A).
XX
KW Botulin; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Clostridium botulinum.
XX
FN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
DR WPI; 2001-016048/02.

New nucleic acids encoding the carboxy- or amino-terminal portions of the
heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
against botulinism.

Example 7: Page 36; 73pp; English.

Botulin neurotoxins are translated as a single 150 kDa polypeptide chain
and then posttranslationally nicked, forming a dichain consisting of a
100 kDa heavy chain and a 50 kDa light chain which remain linked by a
disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
can be used in recombinant expression vectors and expressed in
transformed cells to produce peptide antigens useful for eliciting an
immune response to give protective immunity against botulinum neurotoxin,
which causes botulinism. The nucleic acids are expressible in a recombinant
organisms such as Escherichia coli or Pichia pastoris. The use of
recombinant nucleic acids are advantageous since it eliminates the need
to culture large quantities of hazardous toxin-producing bacterium.
Production yield from the genetically engineered product is also high and
cost of production is lower. The nucleic acids can be derived from
Clostridium botulinum serotypes A-G

Sequence 415 AA;
AAB04083 Length: 415 August 31, 2004 14:39 Type: P Check: 3256 ..

Found using 'seq23' (hayes346.key)
...
3 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVYMSYENFST
      |---| |---|
      53 56 57 60
63 SFWIRIPKYFNSISLNNEVTILNCMENNENSGWKVSLNNGELIWTLDQDTQELKQVVVFKYSQ
      |---| |---|
      81 84 99 102 120
123 MINISDYINRWIFVTITNNLNNSKIYINGRLIDOKPISNLGNIHASNNIMFKLDGCRDT
      |---| |---| |---|
      123 185 190 223 230 241
183 HRYIWFYFNLFDELKEIKDYDNQNSGILKDFWGDYLOQDKPYTMLNLYDPNKTV
      |---| |---| |---|
      244 252 303 310 363 G
243 DVNNGVIRGYMYLKGPRGSMVTNTIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYN
      |---|
      303 310
303 VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVMVMSKNDQGITNKCKMNLQDNN
      |---|
      303 310
363 G
...

-----
14 matches found in sequence:
aab04085; Botulinum toxin C fragment sequence (serotype B).
(from "bt_ags.pep")
TOIG of: aab04085 check: 1259 from: 1 to: 439

ID AAB04085 standard; protein; 439 AA.
XX
AC AAB04085;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulinum toxin C fragment sequence (serotype B).
XX
KW Botulin; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Clostridium botulinum.
XX
FN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
DR WPI; 2001-016048/02.
```

XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.

XX Example 8; Page 38; 73pp; English.

XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organism such as *Escherichia coli* or *Pichia pastoris*. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC *Clostridium botulinum* serotypes A-G

XX Sequence 439 AA;

AA04085 Length: 439 August 31, 2004 14:39 Type: P Check: 1259 ..
Found using 'seq23' (hayes346.key)

1 FNKYNSEILANNIILNRYKDNLDLGSYGAKVYDGVDELNDKNQFKLTSSANSKIRVT
36 39

61 QNQNIIENSVELDFSVFWIRPKYKNDGIONYIHNEYTIINCMMNNSGKWSIRGNRIT
98 101

121 WTLIDINGTKSVFFEYNIREDISEYINRWF

156 TNNLNNAKIYINGKLENTDIKDIREVIANGEEIFKLDGIDIRTOFIWMKYFSIFNTELS
206

216 QSNIEERYKIQSYSEYLKDFWGNFLMYNKYEMFAGNKNYSYIKLKKDSPVGEILTRSKY
228 246 257

276 NONSKYINVRDLVIGKEFIIRKKSNSQSIINDIVRKEDYIYLDFFNLNQEQRVVYKFK
281 284 314 316 331

336 KEEKFLFAPISDSDEFYNTIQIKEYDEQPTYSCQLLFKKDEESTDEIGLIGIRHFVESG
353

396 IVFEYKDYFCISKWYLVKVRKPKYNLKLGNWQFIPKDEGWTE
401 404

13 matches found in sequence:
aab04088 ; Botulism toxin heavy chain C-terminal sequence (serotype A).
(from "bt_ags.pep")
TOIG of: aab04088 check: 7894 from: 1 to: 437

ID AAB04088 standard; protein; 437 AA.
XX
AC AAB04088;

XX 11-APR-2001 (first entry)
XX Botulism toxin heavy chain C-terminal sequence (serotype A).
DE Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
XX recombinant vector; antigen; immune response; vaccine; bacterium;
XX infection.
KW Synthetic.
KW *Clostridium botulinum*.
OS WO200067700-A2.
XX 16-NOV-2000.
XX 12-MAY-2000; 2000WO-US012890.
XX 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133873P.
XX 29-JUL-1999; 99US-0146192P.
XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
PA Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX WPI; 2001-016048/02.
XX N-PSDB; AAA54482.
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX Claim 3; Fig 1b; 73pp; English.
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organism such as *Escherichia coli* or *Pichia pastoris*. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC *Clostridium botulinum* serotypes A-G
XX Sequence 437 AA;
SQAAB04088 Length: 437 August 31, 2004 14:39 Type: P Check: 7894 ..
Found using 'seq23' (hayes346.key)

25 ESNHLDLSRYASKINIGKVNFPDIDKNQIQLFNLESSKIEVLKNAIVNSMYNFPST
75 78 79 82

85 SFWIRPKYFNSISLNNYEYTIINCMMNNSGKWSYVNLQDTQEIQRVVFYKYSQ
103 121 142


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XX 12-MAY-1999;          99US-0133865P.
PR 12-MAY-1999;          99US-0133866P.
PR 12-MAY-1999;          99US-0133867P.
PR 12-MAY-1999;          99US-0133868P.
PR 12-MAY-1999;          99US-0133869P.
PR 12-MAY-1999;          99US-0133873P.
PR 29-JUL-1999;          99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX WPI: 2001-016048/02.
XX N-PSDB; AAA54484.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Disclosure; Fig 3b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
XX Sequence 435 AA;
XX
AA04090 Length: 435 August 31, 2004 14:39 Type: P Check: 2069
Found using 'seq23' (haves346.key)

```

| | |
|-----|---|
| 223 | ESNHLDSLRYASKINIGSKVNFDPDKNQIQLFNLESSKIEVILKNAIVYNSNFST 73 76 77 80 |
| 283 | SFWTRIPKYFNSISLNNBYTIINCMMENNSGHWKVSINTEGIIWLTQDTQEIQRVVFYKISQ 119 140 |
| 143 | MINISDYINERWIFVYTIITNRLNLSKIYINGELIDQKPIISNLGNITHASNINIMFKLDGCEDT 143 |
| 203 | HRYTWIKYFNLFDKELNEKEIKDLYDNQNSGILKDFWGDYLOYDKPYMMLNLYDPNKYV 205 210 243 250 |
| 263 | DVNVNGIRGZMYLKGPRGSVMTTNIYLNSSLYRGTKFIKKYASGNKDNIVRNRNDRYVIN 264 272 |
| 323 | VVQNKYVRLATNASQAGVEKILSALBIPDVGNLSQVVVMKSKNDQGITNCKRMNLQDNN 323 330 |
| 383 | |

```

-----
114 matches found in sequence:
aab04091 ; Botulinum toxin heavy chain C-terminal sequence (serotype B) .
(from "bt_ags pep")
TOIG of: aab04091 check: 6014 from: 1 to: 440

ID AAB04091 standard; protein; 440 AA.
XX
XX AAB04091;
XX AC
XX AC
XX
XX 11-APR-2001 (first entry)
XX
XX Botulinum toxin heavy chain C-terminal sequence (serotype B) .
XX
XX Botulin; toxin; neurotoxin; heavy chain; recombinant expression;
XX recombinant vector; antigen; immune response; vaccine; bacterium;
XX infection.
XX
XX Synthetic.
XX Clostridium botulinum.
XX OS
XX
XX WO2000067700-A2.
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX PF
XX
XX 12-MAY-1999; 99US-0133865P.
XX PR
XX 12-MAY-1999; 99US-0133866P.
XX PR
XX 12-MAY-1999; 99US-0133867P.
XX PR
XX 12-MAY-1999; 99US-0133868P.
XX PR
XX 12-MAY-1999; 99US-0133869P.
XX PR
XX 12-MAY-1999; 99US-0133873P.
XX PR
XX 29-JUL-1999; 99US-0146192P.
XX PR
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX WPI; 2001-016048/02.
XX
XX N-PSDB; AAA54485.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
XX heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX against botulinum.
XX
XX Claim 3; Fig 4b; 73pp; English.
XX
XX Botulinum neurotoxins are translated as a single 150 kDa polypeptide chain
XX and then posttranslationally nicked, forming a dichain consisting of a
XX 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
XX can be used in recombinant expression vectors and expressed in
XX transformed cells to produce peptide antigens useful for eliciting an
XX immune response to give protective immunity against botulinum neurotoxin
XX which causes botulism. The nucleic acids are expressible in a recombinant
XX organism such as Escherichia coli or Pichia pastoris. The use of
XX recombinant nucleic acids are advantageous since it eliminates the need
XX to culture large quantities of hazardous toxin-producing bacterium.
XX Production yield from the genetically engineered product is also high and
XX cost of production is lower. The nucleic acids can be derived from
XX Clostridium botulinum serotypes A-G
XX
XX Sequence 440 AA;
XX
AAB04091 Length: 440 August 31, 2004 14:39 Type: P Check: 6014 ..
Found using 'seq23' (hayes346.key)

```

```

XX Botulism toxin heavy chain C-terminal sequence (serotype D).
DE
XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX Synthetic.
OS Clostridium botulinum.
XX
XX WO200067700-A2.
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
XX 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133873P.
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI
XX WPI; 2001-016048/02.
DR N-PSDB; AAA54487.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Claim 3; Fig 6b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
XX Sequence 451 AA;
SQ

```

AAB04093 Length: 451 August 31, 2004 14:39 Type: P Check: 75
 Found using 'seq23' (hayes346.key)

...

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49 NKNALVDTSGYNAEVRGVNQLNTIYTNDFKLSSGDKIIVNINNILYSAIVENSVV
   |--|
   99 102

109 SFWIKSKDLTNSHNEYTIINSIEQNSGWKLCIRNGNIEWILOQVNRKYKSLIFDYSLSL
   |--|
   125 157

169 SHTGYNKWFVFTTNNMGYMKYLINGELKQSKIEDLVKLDKTIIVFGIDENIDNQ
   |--|
   189

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229 MLWIRDFNIESKELSNEDINIVYEGQILNRVIXDYWGNPLKFDTEYYIINDYIDRYIAP
   274

289 ESNVLVLVQVPRDSKLYTGNPITIKSVSDKNPYSRILNGDNIIILHMLYNSRKTYMIRDTD
   321 |--|
   341

349 TIYATQGGDCSQNCVVVALKQLQNLGNVYGIGIFSINKIVSNKXKYSQIFSSFRENTMLLAD

409 |--| |--| |--|
   IYKPRFSPFNAYTPVAVTNYETKLLSTSSFWKPFISDRDPGWVE
   410 421

-----
12 matches found in sequence:
aab04094 ; Botulism toxin heavy chain C-terminal sequence (serotype E) .
      (from "bt_ags.pep")
      TOIG of: aab04094 check: 2298 from: 1 to: 449

ID AAB04094 standard; protein; 449 AA.
XX
XX AC AAB04094;
XX
XX DT 11-APR-2001 (first entry)
XX
XX DE Botulism toxin heavy chain C-terminal sequence (serotype E) .
XX
XX KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX OS Synthetic.
OS Clostridium botulinum.
XX
XX PN WO200067700-A2.
XX
XX PD 16-NOV-2000.
XX
XX PF 12-MAY-2000; 2000WO-US012890.
XX
XX PR 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133873P.
XX 29-JUL-1999; 99US-0146192P.
XX
XX PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX DR WPI; 2001-016048/02.
DR N-PSDB; AAA54488.
XX
XX PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX PS Claim 3; Fig 7b; 73pp; English.
XX
XX CC Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
CC
CC

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SQ      Sequence 382 AA;
AAB04100 Length: 382 August 31, 2004 14:39 Type: P Check: 1971 ..
Found using 'seq23' (hayes346.key)
...
50      ILNFSEAPGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVNELVNFYLDQKVPEG
      100
110     ENNVLTSSIDTALLEQPKLYTFFSSEFINNVNKPQOALFVSWIQOVLVDFTTENQKS
      130
170     TVDKTIADISIVVYIGLALNIGNEAQKGNFKDALELLGAGILLEPEPELLIPTILVFTIK
      183
230     SFLGSSDNKNKVIKAINNALKERDEKWEVYGFIVSNWMTKINTOFNKRKEQMYQALQNG
      260
290     VNAIKTIIESKYNSTLEEKNELTNKYDIKQIENBELNQKVSIAMNNIDRFLTESSISYLM
      301
350     KLINE
...
-----
6 matches found in sequence:
aab04101 ; Botulism toxin heavy chain N-terminal sequence (serotype F).
(from "bt_ags.pep")
TOIG of: aab04101 check: 9812 from: 1 to: 408

ID      AAB04101 standard; protein; 408 AA.
XX      AAB04101;
AC      AAB04101;
XX      11-APR-2001 (first entry)
XX      Botulism toxin heavy chain N-terminal sequence (serotype F).
XX      Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW      recombinant vector; antigen; immune response; vaccine; bacterium;
KW      infection.
XX      Synthetic.
OS      Clostridium botulinum.
XX      WO200067700-A2.
XX      16-NOV-2000.
XX      12-MAY-2000; 2000WO-US012890.
XX      12-MAY-1999; 99US-0133865P.
XX      12-MAY-1999; 99US-0133866P.
XX      12-MAY-1999; 99US-0133867P.
XX      12-MAY-1999; 99US-0133868P.
XX      12-MAY-1999; 99US-0133869P.
XX      12-MAY-1999; 99US-0133873P.
XX      29-JUL-1999; 99US-0146192P.
XX      (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX      Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI      WPI; 2001-016048/02.
XX      DR      N-PSDB; AAA54497.
XX

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PT      New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT      heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX      against botulism.
PS      Claim 6; Fig 16b; 73pp; English.
XX
CC      Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC      and then posttranslationally nicked, forming a dichain consisting of a
CC      100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC      disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC      -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC      can be used in recombinant expression vectors and expressed in
CC      transformed cells to produce peptide antigens useful for eliciting an
CC      immune response to give protective immunity against botulinum neurotoxin,
CC      which causes botulism. The nucleic acids are expressible in a recombinant
CC      organisms such as Escherichia coli or Pichia pastoris. The use of
CC      recombinant nucleic acids are advantageous since it eliminates the need
CC      to culture large quantities of hazardous toxin-producing bacterium.
CC      Production yield from the genetically engineered product is also high and
CC      cost of production is lower. The nucleic acids can be derived from
CC      Clostridium botulinum serotypes A-G
XX
SQ      Sequence 408 AA;
AAB04101 Length: 408 August 31, 2004 14:39 Type: P Check: 9812 ..
Found using 'seq23' (hayes346.key)
...
43      NNYRNNDLVLDYNSQTIPQISNRTLTNLVDNSYVPRYDSNGTSEIEEYDVVDNFVFF
      93 96
103     YLHAQKVPEGETNISLTSSIDTALLEESKDIPFSSEFIDTINKPVNAALFIDWISKVIRD
      103
163     FTTEATQKSTVDKIADISLIVPYVGLNALNIIIEAKGNFEAFELLGVGILLEFVPELTI
      185
223     FVLIVFTTKSYIDSYENKNAKAIKAINNSLIEREAKWEIYSWIVSNWLTRINTQFNKRKE
      262
283     QMYQALQVQDAIKTAIEVKYNNYTSDEKNRLESEYNNINNEELNKKVSLAMKNIERFM
      285 303
343     TESSISYLMKLINE
...
-----
5 matches found in sequence:
aab04102 ; Botulism toxin heavy chain N-terminal sequence (serotype G).
(from "bt_ags.pep")
TOIG of: aab04102 check: 3960 from: 1 to: 410

ID      AAB04102 standard; protein; 410 AA.
XX      AAB04102;
AC      AAB04102;
XX      11-APR-2001 (first entry)
XX      Botulism toxin heavy chain N-terminal sequence (serotype G).
XX      Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW      recombinant vector; antigen; immune response; vaccine; bacterium;
KW      infection.
XX      Synthetic.
OS      Clostridium botulinum.

```

XX WO200067700-A2.
XX
XX
PD 16-NOV-2000.
XX
XX PF 12-MAY-2000; 2000WO-US012890.
XX
XX PR 12-MAY-1999; 99US-0133865P.
XX PR 12-MAY-1999; 99US-0133866P.
XX PR 12-MAY-1999; 99US-0133867P.
XX PR 12-MAY-1999; 99US-0133868P.
XX PR 12-MAY-1999; 99US-0133869P.
XX PR 12-MAY-1999; 99US-0133873P.
XX PR 29-JUL-1999; 99US-0146192P.
XX
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX DR WPI; 2001-016048/02.
XX DR N-PSDB; AAA54498.
XX
XX PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
XX PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX PT against botulism.
XX
XX PS Claim 6; Fig 17b; 73pp; English.
XX
XX CC Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
XX CC and then posttranslationally nicked, forming a dichain consisting of a
XX CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BONT)
XX CC can be used in recombinant expression vectors and expressed in
XX CC transformed cells to produce peptide antigens useful for eliciting an
XX CC immune response to give protective immunity against botulinum neurotoxin,
XX CC which causes botulism. The nucleic acids are expressible in a recombinant
XX CC organisms such as Escherichia coli or Pichia pastoris. The use of
XX CC recombinant nucleic acids are advantageous since it eliminates the need
XX CC to culture large quantities of hazardous toxin-producing bacterium.
XX CC Production yield from the genetically engineered product is also high and
XX CC cost of production is lower. The nucleic acids can be derived from
XX CC Clostridium botulinum serotypes A-G
XX
XX SQ Sequence 410 AA;
XX
XX AAB04102 Length: 410 August 31, 2004 14:39 Type: P Check: 3960 ..
XX Found using 'seq23' (hayes346.key)

...
14 matches found in sequence:
aab04103 ; Botulism toxin heavy chain C-terminal sequence (serotype F).
(from "bt_ags.pep")
TOIG of: aab04103 check: 8175 from: 1 to: 432
ID AAB04103 standard; protein; 432 AA.
XX
XX AC AAB04103;
XX
XX DT 11-APR-2001 (first entry)
XX
XX DE Botulism toxin heavy chain C-terminal sequence (serotype F).
XX
XX KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
XX KW recombinant vector; antigen; immune response; vaccine; bacterium;
XX KW infection.
XX
XX OS Synthetic.
XX OS Clostridium botulinum.
XX
XX PN WO200067700-A2.
XX
XX PD 16-NOV-2000.
XX
XX PF 12-MAY-2000; 2000WO-US012890.
XX
XX PR 12-MAY-1999; 99US-0133865P.
XX PR 12-MAY-1999; 99US-0133866P.
XX PR 12-MAY-1999; 99US-0133867P.
XX PR 12-MAY-1999; 99US-0133868P.
XX PR 12-MAY-1999; 99US-0133869P.
XX PR 12-MAY-1999; 99US-0133873P.
XX PR 29-JUL-1999; 99US-0146192P.
XX
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX DR WPI; 2001-016048/02.
XX DR N-PSDB; AAA54499.
XX
XX PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
XX PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX PT against botulism.
XX
XX PS Disclosure; Fig 18b; 73pp; English.
XX
XX CC Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
XX CC and then posttranslationally nicked, forming a dichain consisting of a
XX CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BONT)
XX CC can be used in recombinant expression vectors and expressed in
XX CC transformed cells to produce peptide antigens useful for eliciting an
XX CC immune response to give protective immunity against botulinum neurotoxin,
XX CC which causes botulism. The nucleic acids are expressible in a recombinant
XX CC organisms such as Escherichia coli or Pichia pastoris. The use of
XX CC recombinant nucleic acids are advantageous since it eliminates the need
XX CC to culture large quantities of hazardous toxin-producing bacterium.
XX CC Production yield from the genetically engineered product is also high and
XX CC cost of production is lower. The nucleic acids can be derived from
XX CC Clostridium botulinum serotypes A-G
XX
XX SQ Sequence 432 AA;
XX
XX AAB04103 Length: 432 August 31, 2004 14:39 Type: P Check: 8175 ..
XX Found using 'seq23' (hayes346.key)

56 LILDNLSSGIDLPNTEPFTNDDIDIPVYIKQSALKKIFVDGDSLFEYLHQAOTFPSN
106

116 IENQLTNSLDALRNNKNTYFTSTNLVEKANTVGCASLFVNNWVKGVIDFTSESTQKS
136

176 TIDKVDVSIITPY

213 GAAILMEFIPELIPIVGFPTLESYVGNKGHIIMTISNALKKRQKWDYGLVLSQWLS
263

273 TVNTQFTYKERMYNALNNQSAIEKIIEQYNNRYSEEDKMNINIDFNDIFKLNQSNIL
286
304

333 AINNIDDFINQCSISYLMNRMIPLA

1 MSYTNDKILILYFNKLYKKIKDINSILDMRYENKFKIDISGYGSINISGDIYIYSTNRNQ
|---|

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17 20
61  FGIYSSKPESEVNIQAQNDIIYNGRYCNFSISFWVRIPKYFNKVLNNEVYTIIDCIRNNNS
    |---| |---| |---|
    85 88 109
121  GWKISLNKIKIWTLODTAGNNQKLVFNTQMSISDYINKWIFVYITNNRLGNSRIYIN
    |---| |---| |---|
    128 149
181  GNLIDEKISNLGDIHVSNDILFKIVGCDNTFYVGIKVEKVPDTELKTEIETLYSDEPD
    |---| |---| |---|
    213 218
241  PSILKDFWGNLYLLYKRYVLLNLLRLTRKSIQNSNLFNINQORGVYQKFNFSNTRLYTG
    |---| |---| |---|
    251 258 298
301  VEVIIKNGSTDISNTDNFVRKNDLAYINVDVDRDVEYRLYADISIAKPEKIIKLIRTSNS
    |---| |---| |---|
    327 337 340
361  NNSLGQIIVMDSIGNNCTWNFQNNNGNIGLIGFHSNLLVASSWYNNIRKNTSSNGCFW
    |---| |---|
    406
421  SFISKEHGWQEN
-----
14 matches found in sequence:
aab04167 ; Botulism toxin heavy chain C-terminal sequence (serotype G) .
      (from "bt_ags.pep")
      TOIG of: aab04167 check: 8247 from: 1 to: 449

ID  AAB04167 standard; protein; 449 AA.
XX
AC  AAB04167;
XX
DT  11-APR-2001 (first entry)
XX
DE  Botulism toxin heavy chain C-terminal sequence (serotype G) .
XX
KW  Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW  recombinant vector; antigen; immune response; vaccine; bacterium;
KW  infection.
XX
OS  Synthetic.
OS  Clostridium botulinum.
XX
PN  WO2000067700-A2.
XX
PD  16-NOV-2000.
XX
PF  12-MAY-2000; 2000WO-US012890.
XX
PR  12-MAY-1999; 99US-0133865P.
PR  12-MAY-1999; 99US-0133866P.
PR  12-MAY-1999; 99US-0133867P.
PR  12-MAY-1999; 99US-0133868P.
PR  12-MAY-1999; 99US-0133869P.
PR  12-MAY-1999; 99US-0133869P.
PR  12-MAY-1999; 99US-0133873P.
PR  29-JUL-1999; 99US-0146192P.
XX
PA  (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI  Smith IA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
DR  WPI; 2001-016048/02.
XX  N-PSDB; AAA54491.
PT  New nucleic acids encoding the carboxy- or amino-terminal portions of the
```

```

PT  heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT  against botulism.
XX
XX  Claim 3; Fig 10b; 73pp; English.
XX
CC  Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC  and then posttranslationally nicked, forming a dichain consisting of a
CC  100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC  disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC  -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC  can be used in recombinant expression vectors and expressed in
CC  transformed cells to produce peptide antigens useful for eliciting an
CC  immune response to give protective immunity against botulinum neurotoxin,
CC  which causes botulism. The nucleic acids are expressible in a recombinant
CC  organism such as Escherichia coli or Pichia pastoris. The use of
CC  recombinant nucleic acids are advantageous since it eliminates the need
CC  to culture large quantities of hazardous toxin-producing bacterium.
CC  Production yield from the genetically engineered product is also high and
CC  cost of production is lower. The nucleic acids can be derived from
CC  Clostridium botulinum serotypes A-G
XX
XX  Sequence 449 AA;
SQ
AAB04167 Length: 449 August 31, 2004 14:39 Type: P Check: 8247 ..
Found using 'seq23' (hayes346.key)
...
28  RGGRLLDSSGYGATMNVGSDVIFNDIGNGQFKLNNSENSNITAHQSKFVVVDSMFDNFSI
    |---|
    78 81
88  NFWRTPKYNNNDIQTLQNEYTIISCIKNDSGWKVSIKGNRIIWTLLIDVNAKSKSIPFE
    |---|
    109
148  YSIKNDISDYINKWF
...
208  TDTTFXVWKDFNIFGRELNATEVSSLYWISQSTNTLTKDFWGNPLRYDYOYLYLFNQGMQN
    |---|
    258
268  IYIKYFSKASMGETAPRTNFNNAINYNQNLVGLRFLFIKKAASNRRNNNDNVREGDYIY
    |---| |---| |---|
    269 294 298 325 327
    --| |---| |---|
    328 330 338 341
    LNIDNISDESVRVYLVNSKEIQTLFLAPINDDPTFFYDVLQIKKYKERTYNCQILCEK
    328 330 338 341
388  DTKTGLFGIGKFKVDYGVVMDTYDNYFCISQWYLLRRISENINKLRLGNCWQFIPVDEGW
    |---| |---| |---|
    404 411 414
448  TE
-----
7 matches found in sequence:
aab04168 ; Botulism toxin heavy chain N-terminal sequence (serotype A) .
      (from "bt_ags.pep")
      TOIG of: aab04168 check: 8975 from: 1 to: 413

ID  AAB04168 standard; protein; 413 AA.
XX
AC  AAB04168;
```

```
XX 11-APR-2001 (first entry)
XX Botulism toxin heavy chain N-terminal sequence (serotype A).
DE
XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX Synthetic.
OS Clostridium botulinum.
XX WO2000067700-A2.
XX 16-NOV-2000.
XX 12-MAY-2000; 2000WO-US012890.
XX 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI WPI; 2001-016048/02.
DR N-PSDB; AAA54590.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Disclosure; Fig 11b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a chain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
XX Sequence 413 AA;
AB04168 Length: 413 August 31, 2004 14:39 Type: P Check: 8975
Found using 'seq23' (hayes346.key)
...
6 LCIKVNNWDLFFSPSDNFTNDLNGBEITSDTNIEAAEENISLDLIQQVYLTFFDNEP
--|
56 59
66 ENISIELSSDIIGQELMPNIEFPNGKYVELDKYTMFHYLRAQEPHGKSRIALTNSV
--|
101 106
126 NEALLNPSRVYTFPSDDYKVKVKATEAMFLGWQVLVYDFTDSEVSTTDKIADITI
--|
136
```

```
186 IIPY
...
213 GAVILLEFIEIPAIVLGTALVSYIANKVLTVQTIDNALSKEKWEKDEYKYIVTNWLA
--|
263
273 KVTQIDILIRKKWKEALENOAEATKALINYQNYQYTEEKKNINFNIDDLSSKLINESINK
--|
304
333 AMININKFLNQCSVSYLMNSMIPYGVKRLDFDASLKDALKKYIRDNYGTLIGQVDRDKD
--|
380
393 KVNNTLSTDIPFQLSKYVDNQ
-----
10 matches found in sequence:
aab24387; C. botulinum BoNT/A neurotoxin light chain prototoxin SEQ ID NO:7.
(from "bc_ags.pep")
TOIG of: aab24387 check: 3349 from: 1 to: 448
ID AAB24387 standard; protein; 448 AA.
XX
XX AAB24387;
AC
XX 15-FEB-2001 (first entry)
DT
XX
XX C. botulinum BoNT/A neurotoxin light chain prototoxin SEQ ID NO:7.
DE
XX Human; procholecystokinin; CCK A receptor; CCK B receptor; pancreatitis;
KW antiinflammatory.
KW
XX Clostridium botulinum.
OS
XX WO2000061192-A2.
PN
XX
XX 19-OCT-2000.
PD
XX
XX 06-APR-2000; 2000WO-US009142.
PF
XX
XX 08-APR-1999; 99US-00288326.
PR
XX (ALLR ) ALLERGAN SALES INC.
PA
XX Steward LE, Sachs G, Aoki KR;
PI WPI; 2000-679416/66.
XX
XX New composition for treating acute pancreatitis, comprises a pancreatic
PT cell surface marker binding element, a translocation element that
PT transfers polypeptide across vesicular membrane, and a therapeutic
PT element.
XX
XX Disclosure; Page 28; 50pp; English.
PS
XX
XX The present invention describes a composition (I) for treating acute
CC pancreatitis. (I) comprises a first element containing a binding element
CC that binds to a pancreatic cell surface marker, a second element
CC containing a translocation element that facilitates polypeptide transfer
CC across the vesicular membrane, and a third element containing a
CC therapeutic element that inhibits enzyme secretion in pancreatic cell
CC cytoplasm. Also described is a method for making a therapeutic
CC polypeptide having a binding element selective for cholecystokinin (CCK)
CC receptor by expressing within a host cell a recombinant chimeric
CC polypeptide comprising an extein containing a therapeutic element and a
CC translocation element, and an intein located to the carboxy terminal of
CC extein having a cysteine, serine or threonine at its amino terminus, and
CC contacting the extein with a synthetic peptide comprising a CCK amino
CC acid sequence containing an amidated phenylalanine at a natural C-
```

CC a HN domain of a clostridial toxin. Polypeptides of the invention are
 CC useful for the treatment of a disease state associated with neuronal
 CC cells. The polypeptide constructs are useful for delivering therapeutic
 CC substances to neuronal cells. They are useful to treat disorders of the
 CC CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
 CC and infection. They are also useful in gene therapy. The present sequence
 CC is C. botulinum C2 enterotoxin translocation domain with botulinum
 CC neurotoxin type F (BoNT/F) binding domain used in the exemplification of
 CC the invention
 XX

SQ Sequence 1092 AA;

AAE07900 Length: 1092 August 31, 2004 14:39 Type: P Check: 1789 ..
 Found using 'seq23' (hayes346.key)

1 LVSFKFNSVKNKFTINGLMLGGYFYFENDFFENLNIISPTLDGNTLFSKEDINSILGNKI
 16 19

61 IKSARWGL

81 STNSPNCRVELNGEIPNLSTNTVNLIQGVYDIRIEQLMSENQLLNKYEGIKLYWET
 131

141 SDIIKEIIPSEVLLKPNYSNTNEKSKFIPNNTLFSNAKLKANANRDTDRDGPDEWEING

201 YTMVQKAVAWDDKFAANGYKXVSNPKFPCXTANDPYTDFEKVSGQIDFSVSNVARDPMI
 20 220 237

261 SAYPTVGQMERLVVSKSETITGDSTKMSKSTSHSSTNTINTVGAEVSGSLQLAGG
 263

361 INPNIRYNTGTAPVYVNTPTTTIIVIDKQSVATIKQESLIGDYLNPFGTYPHGPPEMA
 411

421 LNTMQFSRLIPINYNQKSIDNGGTVMLSSTQFTGNFAKYNNGNLVTDGNNWGPYLG
 436

481 TIKSTTASL

575 HCIIRKNMNLVKVITFKENISSINIINDTFGVSMTGLSNRSKGQDIYRAATAPSF
 625

635 KSKELKYPGRYMRVIOSEYFPFTTMSYTNDKILLIFNKLKIKKONSLDMRYENNK
 655 677

695 FIDISGYSNISINGDVYIYSTNRNQFIYSSKPSSEVNTAQNNDIINYRQYONFSISFWV
 745

755 RIPKYFNKVLNLEYTIIDCIIRNNNSGWKISLNNKIIWTLOQTAGNNQKLVNTQMIS
 769 788 809

815 ISDYINKWIFVTITNRLNLSRIYINGNLIDEKISLNLGDIHVSNDNLKFIKVCNDRIV
 873

875 GIRYFKVFDLTKGTEIETYSDEPPPSILKDFWGNLYLNKRYLLNLLRTDKSITQNS
 ---|---|

876 881 911 918
 935 NFNINQORGVYQKPNIFSNTLYTGVEIIRKNGSTDISNTDNFVRKNDLAYINVVDRD
 958 987
 995 VYRRLYADISIAKPEKIKLIRTSNNSLSGLIIVMDSIGNNCTMNFQNNNGNIGLGG
 997 1000

1055 HSNLNVASSWYNNIRKNTSSNGCFWFSFISKEHGWEN
 1066

22 matches found in sequence:
 aae07901 ; C. botulinum C2 translocation domain with BoNT/F-binding domain #2.
 (from "Bt_ags.pep")
 TOIG of: aae07901 check: 984 from: 1 to: 1032

ID AAE07901 standard; protein; 1032 AA.

XX AC AAE07901;

XX DT 01-NOV-2001 (first entry)

XX DE C. botulinum C2 translocation domain with BoNT/F-binding domain #2.

XX KW Neuronal cell; binding domain; translocation domain; stroke; epilepsy;

XX KW tumour; infection; neurodegenerative disease; gene therapy;

XX KW botulinum neurotoxin type F; BoNT/F.

XX OS Clostridium botulinum.

XX PN WO200158936-A2.

XX PD 16-AUG-2001.

XX PF 04-DEC-2000; 2000WO-GB004644.

XX PR 02-DEC-1999; 99GB-00028530.

XX PR 07-APR-2000; 2000GB-00008658.

XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX PI Shone CC, Sutton JM, Silman N;

XX DR WPI; 2001-514643/56.

XX PT New non toxic polypeptide for delivery of a therapeutic agent for the
 PT treatment of a CNS disorder comprising a binding domain that translocates
 PT the therapeutic agent into the neuronal cells.

XX PS Example 2; Page 48; 50pp; English.

XX CC The invention relates to a non toxic polypeptide, for delivery of a
 CC therapeutic agent to a neuronal cell, which comprises a binding domain
 CC (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as
 CC HC) that binds to the neuronal cell and a translocation domain (amino
 CC terminal half of HC, designated as HN), that translocates the therapeutic
 CC agent into the neuronal cell, where the translocation domain is not a HN
 CC domain of a clostridial neurotoxin and is not a fragment or derivative of
 CC a HN domain of a clostridial toxin. Polypeptides of the invention are
 CC useful for the treatment of a disease state associated with neuronal
 CC cells. The polypeptide constructs are useful for delivering therapeutic
 CC substances to neuronal cells. They are useful to treat disorders of the
 CC CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
 CC and infection. They are also useful in gene therapy. The present sequence
 CC is C. botulinum C2 enterotoxin translocation domain with botulinum
 CC neurotoxin type F (BoNT/F) binding domain used in the exemplification of
 CC the invention

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XX      Sequence 1032 AA;
SQ
AAE07901 Length: 1032 August 31, 2004 14:39 Type: P Check: 984
Found using 'seq23' (hayes346.key)
1  LVSKFENVKSNKNKVTINGLMCGYFENDFFNLIIISPTLDGNLTFSKEDINSILGNKI
16 19
61  IKSARWIGL
...
81  STNSPNCRVELNGEIFNLSTNTNTVNLIQGNVYDIRIEQIMSENQILLKNYEGIKLYWET
131
141  SDIIEIIPSEVLLKPNYSNTNEKSKFIPNNTLFSNAKLANANRDTDRDGPDEWEING
201  YTMNQXAVAWDDKFAANGKYYKVSNPFKPCCTANDPYTDFEKVSGQIDPSPVMVARDPMI
220
261  SAYPIVGVQMERLVVSKSEITIGDTSKMSKSTSHSTNINTVGAESVSGSIQLAGG
263
...
361  INPNIRYNTGTAAPVNVNPTTTIVIDKQSVATIKQESLIGDYNLPGVTYPIIGEPMA
411
421  LNTMDQPSRLIPINYNOLKSIDNGTGMVLSQFTGNFAKYNNGNLVTDGNNWPGYL
436
481  TIKSTTASL
...
567  NTADKDIHMCIIKRNMMNLVKVITFKENISSINTMSYTNDKILILYFNKLYKIKDKNSIL
617
627  DMYENNKFDISGYGNSINGDVYIYSTNRNQFIYSSKPSVFNIAQNNDIYNGRYQ
685
687  NFSISFWVRIPKYFNKYNLANNEYTIIDCIRNNSGWKISLNYNKIIWTLQDTAGNQKLV
709
747  FNYTQMISIDYINKWIFVTITNNRLGNSRIYINGNLIDEKISNLGDIHVSDNILEFKIV
749
807  GCNDRYVGIRYFKVDFTELKTEIETLYSDEPDPSILKFWGNLYLLNRYLLNLLRT
813 818
867  DKSITQNSFLINQQRGVQKPNIPFNTRYLTGVEVIRKNGSTDISNTDNFVRKNDLA
898
927  YINVVDREVRVLYADISIAKPEKIIKLIRTSNNSNLGQIIIVMDSIGNNCTMNPQNNG
937
940

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987  GNIGLLGFHSNLLVASSWYNNIRKNTSSNGCFWFSFKSKEHGWQEN
1006
-----
22 matches found in sequence:
aae07902 ; C. botulinum C2 translocation domain with TeNT binding domain #1.
(from "bt_ags.pep")
TOIG of: aae07902 check: 4391 from: 1 to: 1112
ID  AAE07902 standard; protein; 1112 AA.
XX
XX  AAE07902;
XX
XX  01-NOV-2001 (first entry)
XX
XX  C. botulinum C2 translocation domain with TeNT binding domain #1.
XX
XX  Neuronal cell; binding domain; translocation domain; stroke; epilepsy;
XX  tumour; infection; neurodegenerative disease; gene therapy;
XX  botulinum neurotoxin; tetanus neurotoxin; TeNT.
XX
XX  Clostridium botulinum.
XX  Clostridium tetani.
XX
XX  WC200158936-A2.
XX
XX  16-AUG-2001.
XX
XX  04-DEC-2000; 2000WO-GB004644.
XX
XX  02-DEC-1999; 99GB-00028530.
XX  07-APR-2000; 2000GB-00008658.
XX
XX  (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
XX  Shone CC, Sutton JM, Silman N;
XX  WPI; 2001-514643/56.
XX
XX  New non toxic polypeptide for delivery of a therapeutic agent for the
XX  treatment of a CNS disorder comprising a binding domain that translocates
XX  the therapeutic agent into the neuronal cells.
XX
XX  Example 2; Page 49; 50pp; English.
XX
XX  The invention relates to a non toxic polypeptide, for delivery of a
XX  therapeutic agent to a neuronal cell, which comprises a binding domain
XX  (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as
XX  HC) that binds to the neuronal cell and a translocation domain (amino
XX  terminal half of HC, designated as HN), that translocates the therapeutic
XX  agent into the neuronal cell, where the translocation domain is not a HN
XX  domain of a clostridial toxin. Polypeptides of the invention are
XX  a HN domain of a clostridial toxin. Polypeptides of the invention are
XX  useful for the treatment of a disease state associated with neuronal
XX  cells. The polypeptide constructs are useful for delivering therapeutic
XX  substances to neuronal cells. They are useful to treat disorders of the
XX  CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
XX  and infection. They are also useful in gene therapy. The present sequence
XX  is C. botulinum C2 enterotoxin translocation domain with tetanus
XX  neurotoxin (TeNT) binding domain used in the exemplification of the
XX  invention
XX
XX  Sequence 1112 AA;
SQ
AAE07902 Length: 1112 August 31, 2004 14:39 Type: P Check: 4391
Found using 'seq23' (hayes346.key)
1  LVSKFENVKSNKNKVTINGLMCGYFENDFFNLIIISPTLDGNLTFSKEDINSILGNKI
16 19
61  IKSARWIGL

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```
...
81 STNSPNCRVELNGEINFNLSTNTNTVNLIQGNVYDIRIEQLMSENQLLNKYEGLKLYWET
131
141 SDIIKEIIPSEVLKPNYSNTNEKSKFIPNNTLFSNAKLKANANROTDROGIDPEWEIING
201 YTMNOKAVAMDDKFAANGYKKYVSNPFKECTANDPYTDFEKVSGQIDPSVMVARDPMI
220
261 SAYPIVGQMERLVVSKSEIITGDTYSKSKSTSHSSTNINTVGAEVSGSLQLAGG
263
...
361 INPNIRYNTGTAPVYNVTPTTIVIDKQSVATIKGQESLIGDYLNPGGTYPIIGBPPMA
411
421 LNTMDFSSRLPIPTNYQLKSIDNGGTVMLSQFTGNFAKYNNGNLVTDGNNWGPYLG
436
481 TIKSTTASL
...
575 HCLIKENMNLVKVITFKENISSINIINDTNFGVQSWTGLSNRSKGDGYYRAATTAPSF
625
635 KSKELYPEGRVMRREVIQSYEPFTKRLDCWDNEEDIDVILKSKSTILNLDINNDIISDI
655
695 SGFNSSVITYPDQVLQVINGKAHLVNNESSEVIVHKAMDIEYNDMFNFNTVSWFLRVP
704
755 KVSASHLEQYGTNEYSLIISMKKXHSLSIGSGWSVLKGNLNIWTLKDSAGEVQITFRDL
769
815 PDKFNAYL
...
828 FTTITNDRLLSANLYINGVLMSAEITGLGAIREDNNTLKLDRCNNNNQYVSIDKPRIF
878
888 CKALNPKETEKLKYSLSITFLDFWGNPLRYDTEYLIIPVASSKDVQLKNTDHWILT
900
923
943
948 NAPSYNGKLNITYRRLNYLNGKFLIKRYTNPNEIDSPVSKGDFIKLYVSYNNNEHIVGYP
961
994
1008 KDGNAFNLDRIILRVGNAPGIPLYKKMEAVKLRLDKTYSVQLKLYDDKNASLGLVGTNH
1032
1068 GQIGNDPNRDILIASNWY
...
```

20 matches found in sequence:

aae07903 ; C. botulinum C2 translocation domain with TeNT binding domain #2.
(from "bt_ags.pep")

TOIG of: aae07903 check: 7337 from: 1 to: 1052

ID AAE07903 standard; protein; 1052 AA.

XX AC AAE07903;

XX DT 01-NOV-2001 (first entry)

XX DE C. botulinum C2 translocation domain with TeNT binding domain #2.

XX KW Neuronal cell; binding domain; translocation domain; stroke; epilepsy;

XX KW tumour; infection; neurodegenerative disease; Gene therapy;

XX KW botulinum neurotoxin; tetanus neurotoxin; TeNT.

XX OS Clostridium botulinum.

XX OS Clostridium tetani.

XX WO200158936-A2.

XX PD 16-AUG-2001.

XX PF 04-DEC-2000; 2000WO-GB004644.

XX PR 02-DEC-1999; 99GB-00028530.

XX PR 07-APR-2000; 2000GB-00008658.

XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX Shone CC, Sutton JM, Silman N;

XX WPI; 2001-514643/56.

XX PT New non toxic polypeptide for delivery of a therapeutic agent for the

XX PT treatment of a CNS disorder comprising a binding domain that translocates

XX PT the therapeutic agent into the neuronal cells.

XX PS Example 2; Page 50; 50pp; English.

XX CC The invention relates to a non toxic polypeptide, for delivery of a

XX CC therapeutic agent to a neuronal cell, which comprises a binding domain

XX CC (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as

XX CC HC) that binds to the neuronal cell and a translocation domain (amino

XX CC terminal half of HC, designated as HN), that translocates the therapeutic

XX CC agent into the neuronal cell, where the translocation domain is not a HN

XX CC domain of a clostridial neurotoxin and is not a fragment or derivative of

XX CC a HN domain of a clostridial toxin. Polypeptides of the invention are

XX CC useful for the treatment of a disease state associated with neuronal

XX CC cells. The polypeptide constructs are useful for delivering therapeutic

XX CC substances to neuronal cells. They are useful to treat disorders of the

XX CC CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours

XX CC and infection. They are also useful in gene therapy. The present sequence

XX CC is C. botulinum C2 enterotoxin translocation domain with tetanus

XX CC neurotoxin (TeNT) binding domain used in the exemplification of the

XX CC invention

XX Sequence 1052 AA;

AAE07903 Length: 1052 August 31, 2004 14:39 Type: P Check: 7337 ..

Found using 'seq23' (hayes346.key)

1 LVSKFENSVKNSKNKYFTINGLMGYGFENDFFNLNIISPTLDGNLTFSKEDINSILGNKI

16 19

61 IKSARWIGL

...

631

649 SKHGWOEN

16 matches found in sequence:
aae35694 ; BONT/F-Hc-DiPT HN domain-factor Xa linker fusion construct.
(from "bt ags.pep")
TOIG of: aae35694 check: 9121 from: 1 to: 657

ID AAE35694 standard; protein; 657 AA.
XX
AC AAE35694;
XX
DT 17-JUN-2003 (first entry)
XX
DE BONT/F-Hc-DiPT HN domain-factor Xa linker fusion construct.
XX
KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
KW BONT/F; translocation domain; HN domain; DiPT; Hc; binding domain;
KW botulinum type F neurotoxin.
XX
OS Corynebacterium diphtheriae.
OS Clostridium botulinum.
OS Unidentified.
OS Chimeric.
XX
PN WO200296467-A2.
XX
XX 05-DEC-2002.
XX
XX 21-MAY-2002; 2002WO-GB002384.
XX
XX 24-MAY-2001; 2001GB-00012687.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
XX Sutton JM, Shone CC;
XX
XX WI; 2003-167247/16.
XX
XX Conjugate for modulating cell survival and cell growth, modulating
XX release of inflammatory mediator from cells, comprises injected bacterial
XX effector protein and a carrier that targets the protein to target cell.
XX
XX Example 12; Page 63-65; 130pp; English.

The invention relates to a conjugate comprising an injected bacterial effector protein and a carrier that targets the effector protein to a target cell. Pharmaceutical composition of the invention is useful for a treatment selected from promoting or inhibiting survival of cells; preventing and reversing damage to cells; killing cells; promoting or inhibiting the growth of cells, apoptosis, release of an inflammatory mediator from cells, division of cells and treating intracellular infection and regulating nitric oxide release from cells. The invention is useful in the manufacture of a medicament for treating a neuronal cell, for intracellular infection, for interfering with intracellular trafficking, for modulating expression of cell-surface markers and for inhibiting secretion from cells. The invention is also useful for treating Prion disease, Alzheimer' disease and wide range of disorders including muscle spasms such as blepharospasm, torticollis and hypersecretion disorders such as chronic obstructive pulmonary disease (COPD), bronchitis and asthma. The present sequence is a fusion construct comprising Corynebacterium diphtheriae diphtheria toxin translocation domain (DiPT-HN domain), botulinum type F neurotoxin binding domain (BONT/F-Hc) from Clostridium botulinum and factor Xa linker peptide. This sequence is used in the exemplification of the invention

Sequence 657 AA;
XX
SQ

AAE35694 Length: 657 August 31, 2004 14:39 Type: P Check: 9121
Found using 'seq23' (hayes346.key)

...

49 NKMSEPNKTVSEKAKQYLEEPHQTALEHPELSELKTVTGTNPVFAGANYAAAVNVAQ
109 VIDSETADNLEKTTAALSILPGIGSVMGADGAVHHNTEEIVASIALSSLMWAQPLV
169 GELVDIGFAAYNFVESIINLFQVVHNSYNRPAYSPGHKTQPFLLHDGYAVSWNTVRSTMSY
229 TNDKILILYFNKLYKIDKNSILDMRYENKFFIDISGYGSNISINGVDVYIYSTNRNQFGI
289 YSSKPSVNIQAQNDIIYNGRYQNFISFWVRIPKYFNKYNLNNEYTIIDCIRNNNSGKW
349 ISLNNKIIWTLODTAGNNOKLVFNVTQMISISDYSINKWIFVTITNNRLGNSRIYINGNL
409 IDEKSISNLGDIHVSDNLFKIVGNCNDRYVGYRKYFKVDTTELKTEIETLYSDEPDPSI
469 LKDFMGNYLLYKNKYVILLNLLRTDKSITQNSNLFNINQORGVQKPNIFSNTLYTGVGV
529 IIRKNGSTDISNTDNFVRKNDLAYINVVDRDVEYRLVADISIAKPEKIKLIRTSNSNS
589 LGQIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWFSFI
649 SKHGWOEN

18 matches found in sequence:
aae35710 ; BONT/F-Hc-DiPT HN domain-thrombin-linker SigD protein fusion constr
(from "bt ags.pep")
TOIG of: aae35710 check: 7092 from: 1 to: 1192

ID AAE35710 standard; protein; 1192 AA.
XX
AC AAE35710;
XX
DT 17-JUN-2003 (first entry)
XX
DE BONT/F-Hc-DiPT HN domain-thrombin-linker SigD protein fusion construct.
XX
KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
KW BONT/F; translocation domain; HN domain; DiPT; Hc; binding domain;
KW botulinum type F neurotoxin; invasion gene D protein; SigD protein.
XX
OS Corynebacterium diphtheriae.
OS Clostridium botulinum.
OS Salmonella typhimurium.
OS Unidentified.
OS Chimeric.

XX PN WO200296467-A2.
 XX PD 05-DEC-2002.
 XX PF 21-MAY-2002; 2002WO-GB002384.
 XX PR 24-MAY-2001; 2001GB-00012687.
 XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 XX PI Sutton JM, Shone CC;
 XX PI WPI; 2003-167247/16.
 XX DR
 XX PT Conjugate for modulating cell survival and cell growth, modulating
 PT release of inflammatory mediator from cells, comprises injected bacterial
 PT effector protein and a carrier that targets the protein to target cell.
 XX PS Example 12; Page 97-101; 130pp; English.
 XX CC The invention relates to a conjugate comprising an injected bacterial
 CC effector protein and a carrier that targets the effector protein to a
 CC target cell. Pharmaceutical composition of the invention is useful for a
 CC treatment selected from promoting or inhibiting survival of cells;
 CC preventing and reversing damage to cells; killing cells; promoting or
 CC inhibiting the growth of cells, apoptosis, release of an inflammatory
 CC mediator from cells, division of cells and treating intracellular
 CC infection and regulating nitric oxide release from cells. The invention
 CC is useful in the manufacture of a medicament for treating a neuronal
 CC cell, for intracellular infection, for interfering with intracellular
 CC trafficking, for modulating expression of cell-surface markers and for
 CC inhibiting secretion from cells. The invention is also useful for
 CC treating Prion disease, Alzheimer' disease and wide range of disorders
 CC including muscle spasms such as blepharospasm, torticollis and
 CC hypersecretion disorders such as chronic obstructive pulmonary disease
 CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
 CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
 CC domain (DipT-HN domain), botulinum type F neurotoxin binding domain
 CC (BoNT/F-Hc) from Clostridium botulinum and thrombin linker peptide and
 CC Salmonella typhimurium truncated invasion gene D protein, SigD. This
 CC sequence is used in the exemplification of the invention.
 XX SQ Sequence 1192 AA;

AAE35710 Length: 1192 August 31, 2004 14:39 Type: P Check: 7092 ..
 Found using 'seq23' (hayes346.key)

...
 336 NELALKGFGKASDYNABALHQLLGNLDRPEARPGWGWGEWLAQYPDNYEYVNTLARQ
 386
 396 IKDIWKNNQHKDGGEPYKLAQRLAMLAHEIDAVPAWNCCKGKDRGTGMDSEIKGEIISL
 413
 456 HQTHMLSAFGS
 ...
 584 NKMSES PNKTVSEKAKOYLEEPHQTALHPHPELSELKTVTGTNPVPFAGANYAAWVNAQ
 634
 644 VIDSETADNLEKXTAALSILPGIGSVWGIADGAVHNTHEIIVAQSLALSMLVAQAIPLV
 704 GELVDIGFAAYNFVESIINLFQVYHNSYNRSAYSPGHKTQPFILHDGYAVSWNTVSTMSY
 714
 ---|
 ---|

764 TNDKILLLYFNKLYKKIKDINSILDMMRYENNNKFIDISGYGNSINGDVYIYSTNRNQFGI
 777
 824 YSSKPSEVNIAQNNDIIYNGRYONFSISFWVRIPKYFNKVNLNNEVTIIDCIIRNNNSGWK
 845
 884 ISLNYNKKIITWLTQDTAGNOKLVFNYYTQMISISDYINKWIFVTITNRLGNSRIYINGNL
 888
 944 IDEKSISNLGDIHVSNDILFKIVGCDTRYGIRPKFVDTGLKTEIETLYSDDEPDPST
 973 978
 1004 LKDFWGNLYLLNKKRYLLMLLRLLTDSITQNSFLNINQORGVYQKFNFSNTFLYTGVEV
 1011 1018
 1064 IIRKNGSTDISNTDNFVRKNDLAYINVDVDRDVEYRLYADISIAKPEKIIKLIRTSNNS
 1087 1097 1100
 1124 LGQIIVMDSIGNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWSEI
 1166
 1184 SKEHGWQEN

 18 matches found in sequence:
 aae35711 ; BoNT/F-Hc-DipT HN domain-factor Xa-linker SigD protein fusion const
 (from "bt_ags.pep")
 TOIG of: aae35711 check: 5992 from: 1 to: 1192
 ID AAE35711 standard; protein; 1192 AA.
 XX AC AAE35711;
 XX DT 17-JUN-2003 (first entry)
 XX DE BoNT/F-Hc-DipT HN domain-factor Xa-linker SigD protein fusion construct.
 XX KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
 KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
 KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
 KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
 KW BoNT/F; translocation domain; HN domain; DipT; Hc; binding domain;
 KW botulinum type F neurotoxin; invasion gene D protein; SigD protein.
 XX OS Corynebacterium diphtheriae.
 OS Clostridium botulinum.
 OS Salmonella typhimurium.
 OS Unidentified.
 OS Chimeric.
 XX PN WO200296467-A2.
 XX PD 05-DEC-2002.
 XX PF 21-MAY-2002; 2002WO-GB002384.
 XX PR 24-MAY-2001; 2001GB-00012687.
 XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 XX PI Sutton JM, Shone CC;
 XX PI WPI; 2003-167247/16.
 XX DR
 XX PT Conjugate for modulating cell survival and cell growth, modulating

PT release of inflammatory mediator from cells, comprises injected bacterial
 PT effector protein and a carrier that targets the protein to target cell.
 XX
 PS Example 12; Page 101-106; 130pp; English.

XX The invention relates to a conjugate comprising an injected bacterial
 CC effector protein and a carrier that targets the effector protein to a
 CC target cell. Pharmaceutical composition of the invention is useful for a
 CC treatment selected from promoting or inhibiting survival of cells;
 CC preventing and reversing damage to cells; killing cells; promoting or
 CC inhibiting the growth of cells; apoptosis, release of an inflammatory
 CC mediator from cells, division of cells and treating intracellular
 CC infection and regulating nitric oxide release from cells. The invention
 CC is useful in the manufacture of a medicament for treating a neuronal
 CC cell, for intracellular infection, for interfering with intracellular
 CC trafficking, for modulating expression of cell-surface markers and for
 CC inhibiting secretion from cells. The invention is also useful for
 CC treating Prion disease, Alzheimer's disease and wide range of disorders
 CC including muscle spasms such as blepharospasm, torticollis and
 CC hypersecretion disorders such as chronic obstructive pulmonary disease
 CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
 CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
 CC domain (DipT-HN domain), botulinum type F neurotoxin binding domain
 CC (BoNT/F-Hc) from Clostridium botulinum and factor Xa linker peptide and
 CC Salmonella typhimurium invasion gene D protein, SigD. This sequence is
 CC used in the exemplification of the invention

SQ Sequence 1192 Aa;

AAE35711 Length: 1192 August 31, 2004 14:39 Type: P Check: 5992 ..
 Found using 'seq23' (hayes346.key)

...

336 NELALKLGFLKASDSYNAAELHOLLNDRPEARPGWGWGLAQPDNVVNTLQRO
 386

396 IKDIWKNNQHHKGGEPYKLAQRLAHLAHEIDAVPAMNCKSGKDRGTGMWSEIKGEIISL
 413

456 HOTHLSAPGS

...

584 NKMSSEPNKTVSEKAKOYLEFHQTALEHPSELKTVTGTNPVFAGANYAAVAVNVAQ
 634

644 VIDSETADNLEKTTAALSILPGISVMGIADGAVHNTTEIVAQSIALSLMVAQATPLV

704 GELVDIGFAYNFVSEINLFPQVHNSYNRSAYSFGHKTPQFLHDGYAVSWNTVRSTMSY
 714

764 TNDKILILYFNKLYKKIKNSILDWYENKFKFIDISGVGSINISGDVYIYSTNRNQFI
 777

824 YSSKPEVNIQAQNDIIYNGRYQNPISFWVRIPKYNKVNLNNEYTIIDCIRNNNSGWK
 845

884 ISLWYKLIWTLDQTAGNQLKLVNTYQTMISDISYVINKWIFVTITNNLGNRIYINGNL
 888

944 IDEKSISNLGDIHVSDNLFKIVGNCNDTRYGIRYFKVFDTELKGTETETLYSDEPDPSI
 973 978

1004 LKDFWGNLYLNKRYLLNLLRTDKSITONSFLNINQQRGVYQKPNIFSNTRYTGVEV
 1011 1018 1058

1064 IIRKNGSTDISNTDNFVRKNDLAYINVVDREYRLYADISIAKPEKIIKLIRTSNSNNS
 1087 1097 1100

1124 LGQIIVMDSIGNCTMNFQNNNGNIGLLGFHSNVLVASSWYNNIRKNTSSNGCFWSFI
 1166

1184 SKEHGWQEN

18 matches found in sequence:
 aae35713 ; BoNT/F-Hc-DipT HN domain-factor Xa linker-YopT protein fusion const
 (from "bt ags.pep")

TOIG of: aae35713 check: 67 from: 1 to: 979

ID AAE35713 standard; protein; 979 AA.

XX AAE35713;

XX AAE35713;

DT 17-JUN-2003 (first entry)

XX BoNT/F-Hc-DipT HN domain-factor Xa linker-YopT protein fusion construct.

XX Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
 KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
 KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
 KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
 KW BoNT/F; translocation domain; HN domain; DipT; Hc; binding domain;
 KW botulinum type F neurotoxin; targetted effector protien; YopT.

XX Corynebacterium diphtheriae.

OS Clostridium botulinum.

OS Yersinia pestis.

OS Unidentified.

OS Chimeric.

XX WO200296467-A2.

XX 05-DEC-2002.

XX 21-MAY-2002; 2002WO-GB002384.

XX 24-MAY-2001; 2001GB-00012687.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX Sutton JM, Shone CC;

XX WPI; 2003-167247/16.

XX Conjugate for modulating cell survival and cell growth, modulating
 PT release of inflammatory mediator from cells, comprises injected bacterial
 PT effector protein and a carrier that targets the protein to target cell.

XX Example 12; Page 110-114; 130pp; English.

XX The invention relates to a conjugate comprising an injected bacterial
 CC effector protein and a carrier that targets the effector protein to a
 CC target cell. Pharmaceutical composition of the invention is useful for a
 CC treatment selected from promoting or inhibiting survival of cells;
 CC preventing and reversing damage to cells; killing cells; promoting or
 CC inhibiting the growth of cells; apoptosis, release of an inflammatory
 CC mediator from cells, division of cells and treating intracellular
 CC infection and regulating nitric oxide release from cells. The invention
 CC is useful in the manufacture of a medicament for treating a neuronal
 CC cell, for intracellular infection, for interfering with intracellular
 CC trafficking, for modulating expression of cell-surface markers and for

CC inhibiting secretion from cells. The invention is also useful for
 CC treating Prion disease, Alzheimer' disease and wide range of disorders
 CC including muscle spasms such as blephorospasm, torticollis and
 CC hypersecretion disorders such as chronic obstructive pulmonary disease
 CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
 CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
 CC domain (DipT-HN domain), botulinum type F neurotoxin binding domain
 CC (BoNT/F-Hc) from Clostridium botulinum and factor Xa linker peptide and
 CC Yersinia pestis targeted effector protein Yopt. This sequence is used in
 CC the exemplification of the invention
 XX
 SQ Sequence 979 AA;

AAE35713 Length: 979 August 31, 2004 14:39 Type: P Check: 67 ..
 Found using 'seq23' (hayes346.key)

...
 38 VETALSHNLQKLSATIKHNQSGRSMRLDKLTSDGKANQRSFTFSMIMYRMHIFVLST
 88 91

98 RVPVAVRESVANYGNINFKFAQTGKAFHLKLIKHSDTASGVCEA

...
 196 LDMFKNGISERMIEHCHLLRPVDVTGTTSEGLDQLNALDTHGIGYKKIHLGGQM
 246

256 SAHAIAAYVNEKSGVTFFDPNFCPEHFSDEKXKRWFTNSFWCN

...
 371 NKWRSBPNKTVSEKAKQYLEBFHQTALEHPELSELKTVGTNPVPAGANYAAWVVAQ
 421

431 VIDSETADNLEKTTAALSILPGIGSVMGADGAVHNTTEIVAQSIALSSLMVAQAIPLV

491 GELVDIGFAAYNFVESIINLFQVHNSYNSAYSFGHKTPFLHDGYAVSWNTVSTMSY
 501

551 TNDKILILYFNKLYKKIKDONSILDMYENKKNFIDISGYGNSINGDVVIYSTRNQPGI
 564

611 YSSKPSVNVIAQNNDIYNGRYQNFISFWWRIPKPYFNKVNLLNNEYTIIDCIRNNNSGHWK
 632 656

671 ISLNYNKIITLQDTAGNQKLVFNFTOMISISDYINKWIFVTITNNRLGNSRIYINGNL
 675 696

731 IDEKISINLGDHIVSDNIIILFKVGCNDTRYGIRYKFKVDFTELKGTETELXSDEPPDSI
 760 765

791 LKDFWGNLYLLKRYVLLMLLRDTSITONSFNELNQORGVYQKPNIFSNTKLYTGVEV
 798 805 845

851 IIRKNGSTDISNTDNFVRKNDLAYINVDVDEYRLYADISIAKPEKIKLIRTSNNS
 874 884 887

911 LQGIIVMDSIGNNCTMNFQNNNGNIGLLGFHNSNLVASSWYNNIRKNTSSNGCFWSFI
 953

971 SKEHGWQEN

 7 matches found in sequence:
 aae35718 ; Clostridium botulinum C2 toxin component 1.
 (from "Bt_ags.pep")
 TOIG of: aae35718 check: 9343 from: 1 to: 431
 ID AAE35718 standard; protein; 431 AA.

XX AC AAE35718;
 XX DT 17-JUN-2003 (first entry)
 XX DE Clostridium botulinum C2 toxin component 1.

XX KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
 KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
 KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
 KW torticollis; blephorospasm; asthma; C2 toxin.

XX OS Clostridium botulinum.
 XX PN WO200296467-A2.
 XX PD 05-DEC-2002.
 XX PF 21-MAY-2002; 2002WO-GB002384.
 XX PR 24-MAY-2001; 2001GB-00012687.

XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 XX PI Sutton JM, Shone CC;
 XX DR WPI; 2003-167247/16.

XX CC Conjugate for modulating cell survival and cell growth, modulating
 PT release of inflammatory mediator from cells, comprises injected bacterial
 PT effector protein and a carrier that targets the protein to target cell.
 XX Example 12; Page 125-127; 130pp; English.

XX CC The invention relates to a conjugate comprising an injected bacterial
 CC effector protein and a carrier that targets the effector protein to a
 CC target cell. Pharmaceutical composition of the invention is useful for a
 CC treatment selected from promoting or inhibiting survival of cells;
 CC preventing and reversing damage to cells; killing cells; promoting or
 CC inhibiting the growth of cells; apoptosis, release of an inflammatory
 CC mediator from cells, division of cells and treating intracellular
 CC infection and regulating nitric oxide release from cells. The invention
 CC is useful in the manufacture of a medicament for treating a neuronal
 CC cell, for intracellular infection, for interfering with intracellular
 CC trafficking, for modulating expression of cell-surface markers and for
 CC inhibiting secretion from cells. The invention is also useful for
 CC treating Prion disease, Alzheimer' disease and wide range of disorders
 CC including muscle spasms such as blephorospasm, torticollis and
 CC hypersecretion disorders such as chronic obstructive pulmonary disease
 CC (COPD), bronchitis and asthma. The present sequence is Clostridium
 CC botulinum C2 toxin component 1. This sequence is used in the
 CC exemplification of the invention
 XX Sequence 431 AA;

AAE35718 Length: 431 August 31, 2004 14:39 Type: P Check: 9343 ..
 Found using 'seq23' (hayes346.key)

...
 51 TKIDNFSTDILFSSLTATIMKEDENQNLFDYERIREALLKNTLDREVIGYVNFPEKLG
 101

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111  INFSDVELNRDISDEILDKVRQIIINQETKESFVSLGNDNSIDESIPVIVKTRVPT
141
171  TFNGVLNNKETVSLLLNQGSIIIPESAIITIKGKDYILIEGSLSQELDFYKGSBAWG
174
231  EKNYGDVSKLSQELGALLEGYHSDYKAINSYLRRNRRVNNDELNKKIELISSALSVKP
234
291  IPETLIAVRRVGIPFDLPSPDFSKKENGELIADTKLNEFIDKWTGKETENLSPSSTS
298
351  L
...

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12 matches found in sequence:
 aae35719 ; Clostridium botulinum C2 toxin component 2.
 (from "bt.ags.pep")
 TOIG of: aae35719 check: 3459 from: 1 to: 721

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ID  AAE35719 standard; protein; 721 AA.
XX
AC  AAE35719;
XX
DT  17-JUN-2003 (first entry)
XX
DE  Clostridium botulinum C2 toxin component 2.
XX
KW  Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
KW  infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
KW  muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
KW  torticollis; blepharospasm; asthma; C2 toxin.
XX
OS  Clostridium botulinum.
XX
PN  WO200296467-A2.
XX
PD  05-DEC-2002.
XX
PF  21-MAY-2002; 2002WO-GB002384.
XX
PR  24-MAY-2001; 2001GB-00012687.
XX
PA  (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI  Sutton JM, Shone CC;
XX
DR  WPI; 2003-167247/16.
XX
PT  Conjugate for modulating cell survival and cell growth, modulating
PT  release of inflammatory mediator from cells, comprises injected bacterial
PT  effector protein and a carrier that targets the protein to target cell.
XX
PS  Example 12; Page 127-130; 130pp; English.
XX
CC  The invention relates to a conjugate comprising an injected bacterial
CC  effector protein and a carrier that targets the effector protein to a
CC  target cell. Pharmaceutical composition of the invention is useful for a
CC  treatment selected from promoting or inhibiting survival of cells;
CC  preventing and reversing damage to cells; killing cells; promoting or
CC  inhibiting the growth of cells; apoptosis, release of an inflammatory
CC  mediator from cells, division of cells and treating intracellular
CC  infection and regulating nitric oxide release from cells. The invention
CC  is useful in the manufacture of a medicament for treating a neuronal
CC  cell, for intracellular infection, for interfering with intracellular
CC  trafficking, for modulating expression of cell-surface markers and for

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CC  inhibiting secretion from cells. The invention is also useful for
CC  treating Prion disease, Alzheimer' disease and wide range of disorders
CC  including muscle spasms such as blepharospasm, torticollis and
CC  hypersecretion disorders such as chronic obstructive pulmonary disease
CC  (COPD), bronchitis and asthma. The present sequence is Clostridium
CC  botulinum C2 toxin component 2. This sequence is used in the
CC  exemplification of the invention
XX
SQ  Sequence 721 AA;

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AAE35719 Length: 721 August 31, 2004 14:39 Type: P Check: 3459 ..
 Found using 'seq23' (hayes346.key)

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1  MLVSKFENSVKSNKNYFTLNLGMGYFENDFFNLIISPTLDGNLTFSEKEDINSILNGK
17 20
61  IIKSARWIGL
...
82  STNSPNCRVELNGEINFNLSTNTVNLIQNVYDIRIEQLMSENQLLNKNEGKLYWET
132
142  SDIIKEIIPSEVLLKPNYSNTNEKSKFIPNNTLFSNAKLKANANRDTRDGIPEWEING
202  YTVNQKAVAWDDKFAANGYKYSNPFKPCPTANDPYTDFEKGSGQIDPSVSMVARDPMI
221 238
262  SAYPIGVQMERLVVSKSEITIGDSTKMSKSTSHSSTNINTVGAEVSGSLQLAGG
264
...
362  INPNRYNTGTAPVNVVPTTTIVIDKQSVATIKQESLIGDYLNPQGTYPPIGEPPMA
412
422  LNTWDFSSRLIPINYNQLKSIDNGGTVMLSSTQFTGNFAKYNNGNLVTDGNNWGPYLG
437
482  TIKSTTASL
...
576  HCIIRKNMNLVKVITFKENISSINIINDTNFGVQSMTGLSNRSKGGQDGIYRAATAPSF
626
636  KSKELKYPEGRYMRFVIQSEYEPFCNFKLNNLIYSSDFDKGYDEFFFYNGSKSFF
656 680 685
696  NISCDIINSNRLSGVFLIEDKLII

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4 matches found in sequence:
 aag79295 ; Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
 (from "bt.ags.pep")
 TOIG of: aag79295 check: 6413 from: 1 to: 207

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ID  AAG79295 standard; protein; 207 AA.
XX
AC  AAG79295;
XX
DT  03-JAN-2002 (first entry)
XX
DE  Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
XX

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KW Neurotoxin; BoNT; vaccine; botulism.
XX Clostridium botulinum.
XX US6287566-B1.
XX 11-SEP-2001.
XX 19-MAY-1995; 95US-00446114.
XX 19-MAY-1995; 95US-00446114.
XX (USSA ) US SEC OF ARMY.
XX Dertzbaugh MT;
XX WPI; 2001-615462/71.
XX New protective epitopes of neurotoxin of Clostridium botulinum, useful
XX for developing vaccines against neurotoxins of Clostridium botulinum and
XX for identifying protective antibodies.
XX Claim 1; Col 25; 14pp; English.
XX The present sequence represents a fragment of the Clostridium botulinum
XX neurotoxin (BoNT). It was produced by amplifying overlapping fragments of
XX the BoNT gene. The amplified fragments were cloned expressed to identify
XX immunogenic polypeptides which are capable of giving rise to protective
XX antibodies. The BoNT polypeptide fragment are useful as vaccines, for
XX immunizing against botulism, and as diagnostic agents to identify
XX protective antibodies
XX Sequence 207 AA;
AAG79295 Length: 207 August 31, 2004 14:39 Type: P Check: 6413 ..
Found using 'seq23' (hayes346.key)
1 IKVNMWDLFFSPSEDFTNDLNKGEEITSDTNEAAENISLDLIOQYLYLTFFNFDNEPEN
129 49 52
61 ISIENLSSDIIGOLELMPNIERFPNGKKYELDKYTWFWHYLRAQEFHKGSRIALTNSVNE
94 97 102
121 ALLNPSRVYTFSSDYVKKVKATEAAMFLGWVQLVYDFTDETSEVSTDKIADITIII
129
181 PY
...
2 matches found in sequence:
aag79296 ; Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
(from "bt_ags.pep")
TOIG of: aag79296 check: 7897 from: 1 to: 140
ID AAG79296 standard; protein; 140 AA.
XX AAG79296;
XX 03-JAN-2002 (first entry)
XX Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
XX Neurotoxin; BoNT; vaccine; botulism.
XX Clostridium botulinum.
XX US6287566-B1.
XX

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PD 11-SEP-2001.
XX 19-MAY-1995; 95US-00446114.
XX 19-MAY-1995; 95US-00446114.
XX (USSA ) US SEC OF ARMY.
XX Dertzbaugh MT;
XX WPI; 2001-615462/71.
XX New protective epitopes of neurotoxin of Clostridium botulinum, useful
XX for developing vaccines against neurotoxins of Clostridium botulinum and
XX for identifying protective antibodies.
XX Claim 1; Col 25; 14pp; English.
XX The present sequence represents a fragment of the Clostridium botulinum
XX neurotoxin (BoNT). It was produced by amplifying overlapping fragments of
XX the BoNT gene. The amplified fragments were cloned expressed to identify
XX immunogenic polypeptides which are capable of giving rise to protective
XX antibodies. The BoNT polypeptide fragment are useful as vaccines, for
XX immunizing against botulism, and as diagnostic agents to identify
XX protective antibodies
XX Sequence 140 AA;
AAG79296 Length: 140 August 31, 2004 14:39 Type: P Check: 7897 ..
Found using 'seq23' (hayes346.key)
1 LNSSLYRGTKFIKKYASGNKDNIVRNDRVYINVVVKNKRYRLATNASQAGVEKILSAL
32 35 42 45
61 EIPDVGNLSQVVVMKSKNDQGITNCKKNLQDNNG
...
30 matches found in sequence:
aag95010 ; C. botulinum type A neurotoxin.
(from "bt_ags.pep")
TOIG of: aag95010 check: 7671 from: 1 to: 1296
ID AAR95010 standard; protein; 1296 AA.
XX AAR95010;
XX 09-JUL-1996 (first entry)
XX C. botulinum type A neurotoxin.
XX Toxin; neurotoxin; fusion protein; antitoxin; vaccine; immunogen.
XX Clostridium botulinum.
XX WO9612802-A1.
XX 02-MAY-1996.
XX 23-OCT-1995; 95WO-US013737.
XX 24-OCT-1994; 94US-00329154.
XX 16-MAR-1995; 95US-00405496.
XX 14-APR-1995; 95US-00422711.
XX 07-JUN-1995; 95US-00480604.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Padhye NV, Kink JA, Thalley BS, Stafford DC;
XX Firea JR;
XX

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DR WPI; 1996-230603/23.
 DR N-PSDB; AAT29244.
 XX Fusion proteins comprising non-toxin protein and part of toxin - useful
 PT to form anti-toxins against Clostridium botulinum type A, and C.
 PT difficile type toxins, and to treat C. difficile intoxication, partic.
 PT diarrhoea.
 XX
 PS Claim 4; Page 344-350; 434pp; English.
 XX
 CC Clostridium botulinum type A neurotoxin (AAR95010) is processed to form a
 CC dimer composed of a light and a heavy chain. It is the product of the
 CC type A neurotoxin gene (AAT29244). The 50 kDa C-terminal portion of the
 CC heavy chain, or C fragment (see also AAR95008), was produced using a
 CC synthetic gene (AAT29245) having codon usage altered to improve
 CC expression in Escherichia coli. Fusion proteins of the type A toxin or C
 CC fragment, with e.g. maltose binding protein or polyhistidine affinity tag
 CC (see also AAR95008), are used to generate neutralising antitoxins and in
 CC vaccine compsns
 XX
 SQ Sequence 1296 AA;
 AAR95010 Length: 1296 August 31, 2004 14:39 Type: P Check: 7671 ..
 Found using 'seq23' (hayes346.key)

1 MQFVNQPNYKDPVNGVDIAVYKIPNVGQMPVKAFKHNIKIWIPIERDTPNPEEGDLN
 21 24

61 PPPEAKQPVSVYD

135 INVLPDGSYRSEELNLVITGFSADIIOFECKSFGHEVLNLTNRNGYGSTQVIRFSPDPTF
 185

195 GFEESELDVTNPLLGAGKATDPATVLAHELHAGHLRYGIAINPNRVKVTNAYVEMS
 233

255 GLEVSFEELRTFGHDAKFIDSLQENEFRLYYNFKFDIASTLNKAKSIVGTTASLOYMK
 287

315 NVFKEKYLLEDSTSGKFSVDKLFKFDKLYKMLTEIYTEDNFVFKFKVLNRKTYLNFDKAVF
 342

375 KINIVPKVNTIYDGFNLRTNLNLAANGQNTIENNMNFTKLNFTGLFFYKLLCYRGI
 384

435 ITSXKSLDGYNKALNDLCIKVNNWDLFTSPSEDNFTNDLNKGEITSDNIEAABENI
 446

495 SLDLIQYYITNFNPEPENISLENLSDIIGQLMLPNIERFPNGKKYELDKYTMFHYL
 503

555 RACEFHEGKSRIALTNSVNEALLNPSRVYTFPSSDYKVKYNKATEAAMFLGWVQLVYDF
 556

615 TDTESEVSTTDKIADITIIPY

660 GAVILLEFIEIPAIPVLGTALVSYIANKVLTQVTDIONALSKRNEKWDVYKIIVTNWLA

710

720 KVTQIDILIRKMKALENOAEATKAIINQYINQYITEEKNNINFNIDDLSSKLNESINK
 751

780 AMININKFLNQCVSVYLMNSMIPYG

884 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLPNLESSKIEVLKNAIVYNSMVNFST
 934 938

944 SFWIRIPKYNFNSISLNNEYTIINCMMNNSGMKVSLSNGEIIITWLTQDTQEIKQRVVFYYSQ
 962 980 1001

1004 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKFIISNLGNIHASNNIMFKLDGCRDT
 1004

1064 HRYTIWKYFNLFDEKLEKEIKDLYDNQNSGILKDFWGDYLDYDKPYMLNLYDPNKYV
 1066 1071 1104 1111 1122

1124 DVNNGVIRGYMYLKGPRGSVMTTNIYLNSSLYRGTKFIIRKYASGNKDNIVRNRDVYIN
 1125 1133 1181

1184 VVYVKRYRLATNASQAGVEKILSALEIPDVGNLSQVVMKSKNDQGITNCKRNLQDNN
 1184 1191

1244 G

30 matches found in sequence:
 aa99339 ; Clostridium botulinum botulism A toxin protein.
 (from "bt ags.pgp")
 TOIG of: aa99339 check: 5431 from: 1 to: 1295

ID AAU99339 standard; protein; 1295 AA.
 XX
 AC AAU99339;
 XX
 XX 07-OCT-2002 (first entry)
 DT
 XX Clostridium botulinum botulism A toxin protein.
 DE
 XX Botulism A toxin; neuroprotective; muscular; BoToX; tetanus toxin; TeToX;
 KW protease cleavage; toxicity; neurotoxin; poison; neural cell; toxin;
 KW post-translational modification; light chain; heavy chain;
 KW spastic condition; stabismus; bophiarospasm; hemifacial spasm;
 KW brain injury; spinal cord injury; stroke; multiple sclerosis;
 KW cerebral palsy; BoNT/A.
 XX Clostridium botulinum.
 OS
 XX
 PH Key Location/Qualifiers
 FT Region 1..437
 FT /note= "Light chain"
 FT Active-site 222
 FT /note= "Forms an active site with Glu223, His226, Glu261,
 FT Tyr365"
 FT Active-site 223
 FT /note= "Forms an active site with His222, His226, Glu261,
 FT Tyr365"
 FT Active-site 226

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FT      /note= "Forms an active site with His222, Glu261,
FT      Tyr365"
FT      Active-site
FT      261
FT      /note= "Forms an active site with His222, Glu223, His226,
FT      Tyr365"
FT      Active-site
FT      365
FT      /note= "Forms an active site with His222, Glu223, His226,
FT      Glu261"
FT      Region
FT      437..448
FT      /note= "Linker region"
FT      Region
FT      449..1295
FT      /note= "Heavy chain"
FT      Misc-difference 1161
FT      /label= OTHER
FT      /note= "OTHER = O, which is not defined in the
FT      specification"
XX      WO200244199-A2.
XX      XX
XX      06-JUN-2002.
XX      PD
XX      XX
XX      PF 27-NOV-2001; 2001WO-US045059.
XX      PR 29-NOV-2000; 2000US-00726949.
XX      XX
XX      PA (ALLR ) ALLERGAN SALES INC.
XX      XX
XX      PI Lin W, Aoki KR, Steward LE;
XX      DR WPI; 2002-557531/59.
XX      DR
XX      Novel modified botulinum toxin or tetanus toxin comprising a protease
XX      PT cleavage site, is useful for treating conditions benefited by neurotoxin
XX      PT activity.
XX      XX
XX      PS Disclosure; Fig 1; 19pp; English.
XX      XX
CC      The invention discloses modified botulinum toxin (BoTOX) or tetanus toxin
CC      CC (TeTOX) which contain new protease cleavage sites. These sites are
CC      CC created in regions where the cleavage site is specifically susceptible to
CC      CC cleavage by a protease that is present in effective levels only in a
CC      CC tissue where toxicity is undesirable and where the cleavage site itself
CC      CC does not inactivate the toxin. BoTOX and TeTOX are neurotoxins which are
CC      CC highly potent and specific poisons of neural cells. The toxins are
CC      CC synthesised in vivo as single chains, which are not toxic, but become
CC      CC active when nicked, in a post-translational modification, to form
CC      CC separate light and heavy chains which are linked through a disulphide
CC      CC bond. The modified toxins are useful to treat conditions benefited by
CC      CC neurotoxin activity (e.g. spastic conditions, including spasm, brain injury,
CC      CC stroke, multiple sclerosis and cerebral palsy) by administering the
CC      CC toxins for their localised production. The advantage of the toxins are
CC      CC that they are deactivated in tissues where toxic activity is undesirable
CC      CC and activated at desired targets. The sequence presented is the
CC      CC Clostridium botulinum botulinum A toxin (BoNT/A) protein
XX      XX
XX      SQ Sequence 1295 AA;
XX      XX
AAU99339 Length: 1295 August 31, 2004 14:39 Type: P Check: 5431 ..
Found using 'seq23' (hayes346.key)

1      PFVNQFNYPVGVVDYAIKIPNVGQMPKAFKIHNIWIPERTFTNPESGDLNP
      20 23
61      PPEAKQVPVSYD
      ...
134      INVIQDGSYRSEELNLVIIGPSADIIQPECKSGFGHNLTRNGVGSQYIRFSPDFTF
      194

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194      GFBSLEVDNPLLGAGKFPATDPAVTLAHGLHAGHRLYGLAIINPNRNVKVTNAYEMS
      232
254      GLEVSFEELRTFGCHDAKFDISLQENEFRLYYNKKFKDIASLTINKAKSIVGTASTLQYMK
      286
314      NVFKEKYLSEDTSKFSDKLFKDKLTKYKMLTEIYTEDNFVKKFVNLNRKTYLNFDKAVF
      341
374      KINIVPKVNYTIYDGFNLRNLTNLAANFNQNTENNMTKLKNGFTGLFEFYKLLCVRGI
      383
      386
434      ITSKTSLDKGYNKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEITSDTNIEAAENI
      445
494      SLDLIQQYYLTFTNFNEPENISLENLSSDIIGOLELMPNIEFPNGKKYELDKYTFPHYL
      502
554      -RAQEFHGKSRIALTNSVNEALLNPSRVYTFSSDYVKKVKNAKATEAAMFLGWVEQLVYDF
      555
614      TDETSEVSTTDKIADITIIPY
      ...
659      GAVILLEFIPEIAIPVLGTFALVSYANKVLTVQITDNLALSKRNEKWDVYKIVTNWLA
      709
719      KVTQTDLIRKKWKEALENQAEATKAIINYQNOYTEEEKNNINFNIDDLSSKLINESINK
      750
779      AMININKFLNQCSVSYLMNSMIPYG
      ...
883      ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVNYSMYENFST
      933
943      SPWIRIPKYPNSISLNNEYTIINCNNNSGWKVSINYEIINWDLQDTQEIQRVVFVKYSQ
      961
      979
1003      MINISDYINRWIFVTITNRLNLSKIYINGRLIDQKIPISNLGNIHASNIMFKLDCRDT
      1003
1063      HRYTWIKYFNLFDKELNEKEIKLDYDNQNSGILKDFWGDYLYQYDKPYMLNLYDPNKVV
      1065 1070
      1103 1110 1121
1123      -DYNNGVIGYVWLKGPGRGSMVTNINLSSLYRGTKFIKKYASGNKONIVNNRNVYIN
      1124 1132
      1180
1183      VVKNKYRLATNASQVVVFILSALEIPDVGNLSQVVVMKSKNDQGITNCKMKMLQDNN
      1183 1190
1243      G

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14 matches found in sequence:
aaw09014 ; Immunogenic type F botulinum toxin heavy chain (aa848-1278).
(from "bt_ags.pep")
TOIG of: aaw09014 check: 6826 from: 1 to: 431

ID AAW09014 standard; protein; 431 AA.
XX
AC AAW09014;
XX
DT 17-OCT-2003 (revised)
DT 31-MAR-1997 (first entry)
XX
XX Immunogenic type F botulinum toxin heavy chain (aa848-1278).
XX
KW Botulinum toxin; neurotoxin; BoNT/F; immunogen; vaccine; botulism.
XX
OS Clostridium botulinum; type F strain Langeland.
XX
PN WO9641881-A1.
XX
PD 27-DEC-1996.
XX
XX 12-JUN-1996; 96WO-GB001409.
XX
PR 12-JUN-1995; 95GB-00011909.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX
DR WPI; 1997-065467/06.
DR N-PSDB; AAT48100.
XX
XX Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant
PT vaccine prodn.
XX
XX Claim 5; Page 16-17; 37pp; English.
XX
XX A polypeptide (AAW09014) comprises the heavy chain (amino acids 848-1278)
CC of a type F botulinum neurotoxin (BoNT/F), and can be produced using a
CC synthetic gene (AAT48101) based on the natural gene sequence (AAT48100)
CC for the heavy chain. The polypeptides and its fragments (see also
CC AAW09015-17) lack the light chain and HN epitopes necessary for
CC metalloprotease activity and toxin internalisation. They are free of
CC botulinum toxin activity but can induce protective immunity to a type F
CC botulinum toxin, making them useful for vaccine prodn. Recombinant
CC polypeptides can be produced in transformed host cells, esp. as fusion
CC proteins, e.g. with maltose binding protein to facilitate purification.
CC (Updated on 17-OCT-2003 to standardise OS field)
XX
SQ Sequence 431 AA;
AAW09014 Length: 431 August 31, 2004 14:39 Type: P Check: 6826 ..
Found using 'seq23' (hayes346.key)

1 SYTNDKILILYFNKLYKKIKONSLDMRYENKFKIDISGYGNSISGVDVYIYSTNRNQF
16 19
61 GIYSKSPSEVNIAQNNDIYGRYQNFISFWRIPKYFNKVLNNEVTIIDICRNNNSG
84 87
121 WKISINYNKIWTLDQTAGNQKLVFNVTOMISIDYINKWTFVTITNNRLGNSRIYNG
127
181 NLIIDEKSIENLGDIVHSDNILFKIVGCNDTRYGVIRYFKVDFTELGTKEITFLYSDEPD
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```
212 217
241 SILKDFWGNLYLLNRYLLNLRDKSITQNSFLNINQORGVYQKPNIFSNTRLYTG
250 257
297
301 EVIIRKNGSDISNTDNFVRKNDLAYINVVDREVYRLYADISIAKPEKIILKIRTSNS
326 336 339
405
361 NSLQOIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNVLVASSWYNNIRKNTSSNGCFWS
405
421 FISKEHGWQEN
-----
4 matches found in sequence:
aaw09015 ; Immunogenic type F botulinum toxin polypeptide (aa848-991).
(from "bt_ags.pep")
TOIG of: aaw09015 check: 2219 from: 1 to: 144

ID AAW09015 standard; protein; 144 AA.
XX
AC AAW09015;
XX
DT 17-OCT-2003 (revised)
DT 31-MAR-1997 (first entry)
XX
XX Immunogenic type F botulinum toxin polypeptide (aa848-991).
XX
KW Botulinum toxin; neurotoxin; BoNT/F; immunogen; vaccine; botulism.
XX
OS Clostridium botulinum; type F strain Langeland.
XX
PN WO9641881-A1.
XX
PD 27-DEC-1996.
XX
PF 12-JUN-1996; 96WO-GB001409.
XX
PR 12-JUN-1995; 95GB-00011909.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX
DR WPI; 1997-065467/06.
XX
XX Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant
PT vaccine prodn.
XX
XX Claim 5; Page 17-18; 37pp; English.
XX
XX Novel polypeptides (AAW09014-17) respectively comprise amino acids 848-
CC 1278, 848-991, 992-1135 and 1136-1278 in the heavy chain of a type F
CC botulinum neurotoxin (BoNT/F). They lack the L chain and HN epitopes
CC necessary for metalloprotease activity and toxin internalisation. They
CC are free of botulinum toxin activity but can induce protective immunity
CC to a type F botulinum toxin, making them useful for vaccine prodn.
CC Recombinant polypeptides can be produced in transformed host cells, esp.
CC as fusion proteins, e.g. with maltose binding protein to facilitate
CC purification. (Updated on 17-OCT-2003 to standardise OS field)
XX
SQ Sequence 144 AA;
AAW09015 Length: 144 August 31, 2004 14:39 Type: P Check: 2219 ..
Found using 'seq23' (hayes346.key)

1 SYTNDKILILYFNKLYKKIKONSLDMRYENKFKIDISGYGNSISGVDVYIYSTNRNQF
```

16 19

61 GIVSKPESEVNIAQNNDIIVNGRYQNFISFWVRIPKYPKVNLANNEYTIIDCIRNNNSG
84 87 |--| |--|
108

121 WKTSLNKNKIITWLTQDTAGNNQKL
127 |--| |--|

5 matches found in sequence:
aaw09016 ; Immunogenic type F botulinum toxin polypeptide (aa992-1135).
(from "bt_ags.pep")
TOIG of: aaw09016 check: 2000 from: 1 to: 144

ID AAW09016 standard; protein; 144 AA.
XX AAW09016;
XX AC
XX DT 17-OCT-2003 (revised)
XX DT 31-MAR-1997 (first entry)
XX DE Immunogenic type F botulinum toxin polypeptide (aa992-1135).
XX KW Botulinum toxin; neurotoxin; BoBT/F; immunogen; vaccine; botulism.
XX OS Clostridium botulinum; type F strain Langeland.

XX PN WO9641881-Al.
XX PD 27-DEC-1996.
XX PF 12-JUN-1996; 96WO-GB001409.
XX PR 12-JUN-1995; 95GB-00011909.
XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX PI Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX DR WPI; 1997-065467/06.
XX CC Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant vaccine prodn.
XX PT
XX PS Claim 5; Page 18-19; 37pp; English.

XX CC Novel polypeptides (AAW09014-17) respectively comprise amino acids 848-1278, 848-991, 992-1135 and 1136-1278 in the heavy chain of a type F botulinum neurotoxin (BoNT/F). They lack the L chain and HN epitopes necessary for metalloprotease activity and toxin internalisation. They are free of botulinum toxin activity but can induce protective immunity to a type F botulinum toxin, making them useful for vaccine prodn.
XX CC Recombinant polypeptides can be produced in transformed host cells, esp. as fusion proteins, e.g. with maltose binding protein to facilitate purification. (Updated on 17-OCT-2003 to standardise OS field)

XX Sequence 144 AA;

AAW09016 Length: 144 August 31, 2004 14:39 Type: P Check: 2000 ..
Found using 'seq23' (hayes346.key)

1 VFNVTQMISISDYINKWIFVTITNNRLGNSRIYINGNLIDEKSIISNLGDIHVSDNIFKI
4 7 |--| |--| |--| |--|

61 VGCNDRYVCGIRYKFKVDLTKGTXETIETLYSDEPDFSILKDFGWNLLNRYLLNLLR
68 71 76 |--| |--| |--| |--|
106 113

121 TDKSITQNSFNLNQQRGVYQKP

5 matches found in sequence:

aaw09017 ; Immunogenic type F botulinum toxin polypeptide (aall36-1278).
(from "bt_ags.pep")
TOIG of: aaw09017 check: 6556 from: 1 to: 143

ID AAW09017 standard; protein; 143 AA.
XX AAW09017;
XX AC
XX DT 17-OCT-2003 (revised)
XX DT 31-MAR-1997 (first entry)
XX DE Immunogenic type F botulinum toxin polypeptide (aall36-1278).
XX KW Botulinum toxin; neurotoxin; BoBT/F; immunogen; vaccine; botulism.
XX OS Clostridium botulinum; type F strain Langeland.
XX PN WO9641881-Al.
XX PD 27-DEC-1996.
XX PF 12-JUN-1996; 96WO-GB001409.
XX PR 12-JUN-1995; 95GB-00011909.

XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX PI Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX DR WPI; 1997-065467/06.
XX CC Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant vaccine prodn.
XX PT
XX PS Claim 5; Page 19; 37pp; English.

XX CC Novel polypeptides (AAW09014-17) respectively comprise amino acids 848-1278, 848-991, 992-1135 and 1136-1278 in the heavy chain of a type F botulinum neurotoxin (BoNT/F). They lack the L chain and HN epitopes necessary for metalloprotease activity and toxin internalisation. They are free of botulinum toxin activity but can induce protective immunity to a type F botulinum toxin, making them useful for vaccine prodn.
XX CC Recombinant polypeptides can be produced in transformed host cells, esp. as fusion proteins, e.g. with maltose binding protein to facilitate purification. (Updated on 17-OCT-2003 to standardise OS field)

XX Sequence 143 AA;

AAW09017 Length: 143 August 31, 2004 14:39 Type: P Check: 6556 ..
Found using 'seq23' (hayes346.key)

1 NIFSNTRLTGVETIIRKNGSTDISTNDFVRKNDLAYINVDVDRVEYRLYADISTAKPE
9 12 |--| |--| |--| |--| |--|
38 41 48 51 51 54

61 KIILKIRTSNNLSGLIIVMDSIGNNCTNFPQNNNGNIGLLGFHSHNLVASSWYNNI
117 |--| |--|

121 RKNTSSNGCFWSFISKEHGWQEN

3 matches found in sequence:

aaw28014 ; Amino acid sequence of botulinum neurotoxin C1 precursor.
(from "bt_ags.pep")
TOIG of: aaw28014 check: 1448 from: 1 to: 193

ID AAW28014 standard; protein; 193 AA.

```

AC AAW28014;
XX
XX 27-AUG-1998 (first entry)
XX
XX Amino acid sequence of botulinum neurotoxin C1 precursor.
DE
XX Staphylococcus aureus protein; ribozyme; antisense sequence; control;
KW Staphylococcal gene; regulatory element; bacterial gene expression;
KW vaccine; Staphylococcal infection; food poisoning; scaled skin syndrome;
XX toxic shock syndrome.
XX
XX Staphylococcus aureus.
OS
XX
XX Key Location/Qualifiers
FH
XX
XX Misc-difference 1..193
FT /note= "residues designated X are not defined in the
FT specification"
XX
XX WO9730070-A1.
XX
XX 21-AUG-1997.
XX
XX 19-FEB-1997; 97WO-US002318.
XX
XX 20-FEB-1996; 96US-0011888P.
XX
XX (SMIK ) SMITHKLINE BEECHAM CORP.
XX
XX Black MT, Burnham MK, Hodgson JB, Knowles DJC, Nicholas RO;
PI Pratt JM, Reichard RW, Rosenberg M, Ward JM;
XX
XX WPI; 1997-424969/39.
XX
XX N-PSDB; AAT83970.
XX
XX Novel polypeptide(s) from Staphylococcus aureus strain WCUH29 - used to
PT isolate antimicrobial compounds, and in vaccines against S. aureus
PT infection.
XX
XX Claim 6; Page 408-409; 989pp; English.
XX
XX The present sequence represents a Staphylococcus aureus protein, that,
CC based on homology with a Clostridium botulinum protein, is believed to be
CC a botulinum neurotoxin type C1 precursor. The DNA sequence was isolated
CC from a library of clones of S. aureus WCUH 29 in Escherichia coli. The
CC DNA sequence can be used in the construction of ribozymes and antisense
CC sequences to control the expression of Staphylococcal genes. The DNA
CC sequence is also useful as a source of regulatory elements for the
CC control of bacterial gene expression. The present protein may be used to
CC produce vaccines to enable a host to produce specific antibodies with
CC antibacterial action. These vaccines and antibodies would protect a host
CC against invasion by S. aureus, and conditions relating to Staphylococcal
CC infection, e.g. Staphylococcal food poisoning, scaled skin syndrome, and
XX toxic shock syndrome
XX
XX Sequence 193 AA;
SQ
AAW28014 Length: 193 August 31, 2004 14:39 Type: P Check: 1448
Found using 'seq23' (hayes346.key)
1 MKKKLLVLTMTLPATQLINSHAKASVTESVDTKFVVPESGINKIIPAYDEFKSPKVN
50 53
61 VSNLTDNKFNVSSEDLNKNIVDSSASKIVDKNFAPVESKLGNIIVPEYKEINRNVATN
108
121 NPASQQVDKHFVAKGPEVNRFTQKNVHHFTTQTHYKKVITSXKINTCXLTCXCKRI
158
181 LLIITLLIHRLA

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1 match found in sequence:
aaw37239; Partial sequence of botulinum neurotoxin serotype E associated prot
(from "bt_ags.pep")
TOIG of: aaw37239 check: 4278 from: 1 to: 10

ID AAW37239 standard; peptide; 10 AA.
XX
XX AAW37239;
AC
XX
XX 17-JUN-1998 (first entry)
DT
XX
XX Partial sequence of botulinum neurotoxin serotype E associated protein.
DE
XX Clostridia; botulinum toxin; neurotoxin; serotype E; vaccine; antibody;
KW acetylcholine; presynaptic nerve.
KW
XX Clostridium botulinum.
OS
XX
XX WO9801754-A1.
XX
XX 15-JAN-1998.
XX
XX 08-JUL-1996; 96WO-US011383.
XX
XX 08-JUL-1996; 96WO-US011383.
XX
XX (UYMA-) UNIV MASSACHUSETTS DARTMOUTH.
XX
XX Singh BR, Zhang Z;
XX
XX WPI; 1998-101196/09.
XX
XX Polypeptide complex synthesised by Clostridia - useful in, e.g. producing
PT vaccines for protecting animals against serotype E neurotoxin.
PT
XX
XX Claim 14; Page 3; 38pp; English.
XX
XX A new peptide complex synthesised by Clostridia bacteria comprises the
CC serotype E botulinum neurotoxin and five neurotoxin associated peptides
CC of molecular weights 118, 80, 65, 40 and 18 kDa respectively. The present
CC sequence represents a partial sequence of the 65 kDa peptide. Also
CC claimed are: (1) detecting the serotype E neurotoxin complex in
CC biological samples by: (a) contacting with an antibody or polypeptide
CC specifically binding to a polypeptide of the complex, and (b) detecting
CC antibody- or polypeptide-bound polypeptide, indicating the presence of
CC serotype E. neurotoxin; (2) an antibody binding to the complex, or one of
CC the five neurotoxin associated polypeptides, and (3) polypeptides
CC isolated from the complex. The complex can be used to produce
CC therapeutics for treating diseases resulting from excessive acetylcholine
CC release from presynaptic nerve terminals causing undesirable contraction
CC of smooth or skeletal muscle cells and resulting in, e.g. spasmodic
CC torticollis, essential tremor, spasmodic dysphonia, charley horse,
CC strabismus, blepharospasm, oromandibular dystonia, spasms of the
CC sphincters of the cardiovascular, gastrointestinal or urinary systems,
CC tardive dyskinesia, profuse sweating, lacrimation or mucous secretion.
CC The complex can also be used to produce therapeutics for treating
CC spasticity occurring secondary to brain ischaemia, traumatic injury of
CC the brain or spinal cord, tension headaches, pain caused by sporting
CC injuries or arthritic contractions. The complex may further be used,
CC within a carrier to prepare vaccines, useful for, e.g. vaccinating
CC animals against serotype E neurotoxin. The polypeptides can be used for
CC testing foodstuff, or diagnosing vertebrate gastrointestinal, blood or
CC tissue samples, for infection with serotype E neurotoxin, useful in
CC preventing botulism
XX
XX Sequence 10 AA;
SQ
AAW37239 Length: 10 August 31, 2004 14:39 Type: P Check: 4278
Found using 'seq23' (hayes346.key)
1 TNLXPYIIYD

```

6 9

17 matches found in sequence:
 aaw56007 ; Recombinant botulinum neurotoxin type A LH423/A.
 (from "bt_ags.pep")

TOIG of: aaw56007 check: 6527 from: 1 to: 871

ID AAW56007 standard; protein; 871 AA.

XX AC AAW56007;

XX DT 27-JUL-1998 (first entry)

XX DE Recombinant botulinum neurotoxin type A LH423/A.

XX XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
 KW detection; tetanus; non-toxic; toxin.

XX OS Synthetic.

XX OS Clostridium botulinum.

XX XX WO9807864-A1.

XX PN 26-FEB-1998.

XX PD 22-AUG-1997; 97WO-CB002273.

XX PF 23-AUG-1996; 96GB-00017671.

XX PR 13-DEC-1996; 96GB-00025996.

XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX PA (SPRY-) SPEYWOOD LAB LTD.

XX PI Shone CC, Quinn CP, Foster KA;

XX WPI; 1998-169168/15.

XX DR N-PSDB; AAW26279.

XX PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.

XX PS Example 1; Page 33-35; 137pp; English.

XX CC The present sequence represents a recombinant neurotoxin protein from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain
 CC is adapted to cleave one or more vesicle or plasma-membrane associated
 CC proteins essential to exocytosis, and where the second domain is adapted:
 CC (a) to translocate the protein into a cell; (b) to increase the
 CC solubility of the protein compared to the solubility of the first domain
 CC on its own, or (c) both to translocate the protein into a cell and to
 CC increase the solubility of the protein compared to the solubility of the
 CC first domain on its own, the protein being free of clostridial neurotoxin
 CC (CN) and free of CN precursor that can be converted into toxin by
 CC proteolytic action. The recombinant proteins can be used as therapeutic
 CC agents for targeting cells expressing a relevant substrate. The products
 CC can also be used as immunogens and as non-toxic standards for the
 CC assessment and development of in vitro assays for the detection of
 CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
 CC environmental samples

XX SQ Sequence 871 AA;

AAW56007 Length: 871 August 31, 2004 14:39 Type: P Check: 6527 ..
 Found using 'seq23' (hayes346.key)

1 1 MQFVNKQFNKDPVNGVDIAYIKIPNAGQMOPVKAPKIHNIWIPDRDTFTNPEGDILN
 21 24

61 PPPEAKQVPVSYYD

```

...
135 INVIQDGSYRGEELNLVIIGPSADIIQFECKSFGEVLNLTRNGYGSQYIRFSPDFTF
185
195 GFESLEVDNPLLGAGKFPATDPAVTLAHLIHAGRLYGIAINPNRVKVTNAYEWS
233
255 GLEVSPEELRTFGGDAKFIDSLQENEFRLYYNKEFKDIASLTNKAKSIVGTASLQYMK
287
315 NVFKEKYLISEDTSGRFSVDKLFKDFKLYRMLTEIYTEDNFVKFKVLNRKTYLNFDAVF
342
375 KINIVPKVNYTIYDGNLENLTNLAANFNGONTNMMNFTKLKNFTGLPEFYKLLCVRGI
384
435 ITSKTKSLDKGYNKALNDLCIKVNNWDLFPSSEDNFTNDLNKGEEITSDTNEAAEENI
446
495 SLDLIQYYLTNFEDNEPENISNIENLSSDIIIGOLELMPNIERFPNGKKYELDKYTMFHYL
503
555 -| RAQEFHGKSRIALTNSVNEALINPSRVYTFPSDYVKVKNKATEAAMFLGWVEQLVYDF
583
615 TDETSEVSTTDKIADITIIPY
...
660 GAVILLEFTEIPAIVLGTGTFALVSYIANKVLTVQITIDNALSKNEKWDVEYKIVTNWLA
710
720 KVNTQIDLIRKMKALENQAEBATKAIINYQNQYTEEEKNNINFNIDDLSSKLNESINK
751
780 AMININKFLNQCSVSLMNSMIPYG
...
-----
17 matches found in sequence:
aaw56008 ; Botulinum neurotoxin type A BoNT/A.
(from "bt_ags.pep")
TOIG of: aaw56008 check: 6525 from: 1 to: 871

ID AAW56008 standard; protein; 871 AA.
XX AC AAW56008;
XX DT 27-JUL-1998 (first entry)
XX DE Botulinum neurotoxin type A BoNT/A.
XX KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX KW detection; tetanus; non-toxic; toxin.
XX OS Clostridium botulinum.
XX PN WO9807864-A1.

```

PD 26-FEB-1998.
 XX
 PF 22-AUG-1997; 97WO-GB002273.
 XX
 PR 23-AUG-1996; 96GB-00017671.
 PR 13-DEC-1996; 96GB-00025996.
 XX
 PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 PA (SPEY-) SPEYWOOD LAB LTD.
 XX
 PI Shone CC, Quinn CP, Foster KA;
 XX WPI; 1998-169168/15.
 DR N-PSDB; AAV26280.
 XX
 XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.
 XX
 XX Disclosure; Page 52-54; 137pp; English.
 PS
 CC The present sequence represents botulinum neurotoxin type A from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain
 CC is adapted to cleave one or more vesicle or plasma-membrane associated
 CC proteins essential to exocytosis, and where the second domain is adapted:
 CC (a) to translocate the protein into a cell; (b) to increase the
 CC solubility of the protein compared to the solubility of the first domain
 CC on its own, or (c) both to translocate the protein into a cell and to
 CC increase the solubility of the protein compared to the solubility of the
 CC first domain on its own, the protein being free of clostridial neurotoxin
 CC (CN) and free of CN precursor that can be converted into toxin by
 CC proteolytic action. The recombinant proteins can be used as therapeutic
 CC agents for targeting cells expressing a relevant substrate. The products
 CC can also be used as immunogens and as non-toxic standards for the
 CC assessment and development of in vitro assays for the detection of
 CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
 CC environmental samples
 XX
 SQ Sequence 871 AA;
 AAW56008 Length: 871 August 31, 2004 14:39 Type: P Check: 6525 ..
 Found using 'seq23' (hayes346.key)

1 MPFVNKQFNKYDVPNGVDIAVIKIPNAGQMPVKAFKIHKKIWIPIERDTFTNPEEGDLN
 21 24
 61 PPPEAKQVPVSYDD
 ...
 135 INVIQDGSYRSELNLVIGPSADIIQFECKSGHEVLNITRNGYSGTQYIRFSPDFTF
 185
 195 GFEESELDVTNPLLGAGKFAFDPAVTLAHELHAGHRLYGIAINPNRVKVTNAYVEMS
 233
 255 GLEVSFEELRTFGGHDAKFIDSLOENEFRLYYNKKFKDIASTLNKAKSIVGTASTLQYMK
 287
 315 NVFKEKYLLEDTSKGSFVDKIKFDKLYKMLTEIYTEDNFVKFKVLNRKTYLNFDAVF
 342
 375 KINIVPKVNYTYIDGFLNRLNLTNLAANFNQNTNINNMFTKLKNTGLFEPFKLLCVRGI
 384 387

435 ITSSTKSLDKGYNKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEITSDTINIEAEBENI
 446
 495 SLDLIQOYLTFTNFDFNEPENISIEIENLSSDIIGLELMPNIEFPFGKKYELDKYTMFHYL
 503
 555 RAQFEHKGKSRIALTNSVNEALLNPSRVYITFFSSDYVKKNKATEAAMFLGWVQLVYDF
 556
 615 TDETSEVSTTDDKIADITIIPY
 ...
 660 GAVILLEFPIEIAIPVLGTALVSYIANKVLTVQTIDNALSKRNEKWDVYKYIVTNWLA
 710
 720 KVNTQIDILRKKEALENQAEATKAIINYOYQYTBEEKNNINFINIDDLSSKLNESINK
 751
 780 AMININKFLNQCSVSYLMSMIPYG
 ...

 16 matches found in sequence:
 aaw56009 ; Recombinant botulinum neurotoxin type A L/4H423/A.
 (from "bt ags.pgp")
 TOIG of: aaw56009 check: 543 from: 1 to: 875
 ID AAW56009 standard; protein; 875 AA.
 XX
 AC AAW56009;
 XX
 DT 27-JUL-1998 (first entry)
 XX
 DE Recombinant botulinum neurotoxin type A L/4H423/A.
 XX
 KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
 KW detection; tetanus; non-toxic; toxin.
 XX
 OS Synthetic.
 OS Clostridium botulinum.
 XX
 PN WO9807864-A1.
 XX
 PD 26-FEB-1998.
 XX
 PF 22-AUG-1997; 97WO-GB002273.
 XX
 PR 23-AUG-1996; 96GB-00017671.
 PR 13-DEC-1996; 96GB-00025996.
 XX
 PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 PA (SPEY-) SPEYWOOD LAB LTD.
 XX
 PI Shone CC, Quinn CP, Foster KA;
 XX WPI; 1998-169168/15.
 DR N-PSDB; AAV26281.
 XX
 PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.
 XX
 PS Example 1; Page 58-60; 137pp; English.
 CC The present sequence represents a recombinant neurotoxin protein from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain

CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 875 AA;

AAW56009 Length: 875 August 31, 2004 14:39 Type: P Check: 543 ..
Found using 'seq23' (hayes346.key)

```
1  MQFVNKQFNKDPVNGVDIAYIKIPNAGQMPVKAFKIHNKIWIPIERDTFTNPEEGDLN
21 24
61  PPPEAKQVPVSYD
...
135  INVIQDGSYRSEELNLVIIGPSADIIQFECKSFGEVNLNTRNGYGSTQVIRESPDFTF
185
195  GFESLEVDNPLLGAGKFNATDPAVLAHELHAGHLYGIAINPNRVKVTNAYTEMS
233
255  GLEVSFEELTFGGHDAKFIDSLQENEFRLYYNKFQDKDIASLNLKAKSIVGTTASLQYMK
287
315  NVFKERYLLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKFKVLNRKTYLNFDKAVF
342
375  KINIVPKVNTIYDGFNLRLNTLAAANFGQNTTEINNMNFTKLKNTGLFPEFYKLLCVRG
384
435  ITSKTSLDKGYNSADGALNDLCIKVNNWDLFPSPEDNFTNDLNGKEITSDTNEAA
507
495  BENISLDLIQQYLYTFNDFNEPENISLENLSDIIQGLELMPNIEFPFGKVKYELDKYTM
555  FHYLRQBEFHGKSRIALNSVNEALLNPSRVYTFPSSDYVKKVKNKATEAAMFLGWVEQL
587
615  VYDFDTESEVSTDKIADITIIIPY
755
664  GAVILLEFIPEIAPVLGTFAVLSYIANKVLTVQITIDNALSKENKWEVYKYIVTNWLA
714
724  KVTQIDILIRKKMKEALENOAEATKAIINQYNQVTEEEKNNINFNIDDLSSKLNESINK
755
784  AMININKFLNQCSVSYLMSNIPYG
```

...

17 matches found in sequence:

aw56010 ; Recombinant botulinum neurotoxin type A LFXa/3H423/A.
(from "bt_ags.pep")
TOIG of: aaw56010 check: 4601 from: 1 to: 878

ID AAW56010 standard; protein; 878 AA.

AC AAW56010;

XX 27-JUL-1998 (first entry)

XX Recombinant botulinum neurotoxin type A LFXa/3H423/A.

XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.

XX Synthetic.

OS Clostridium botulinum.

XX WO9807864-A1.

XX 26-FEB-1998.

XX 22-AUG-1997; 97WO-GB002273.

XX 23-AUG-1996; 96GB-00017671.

PR 13-DEC-1996; 96GB-00025996.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX (SPEY-) SPEYWOOD LAB LTD.

XX Shone CC, Quinn CP, Foster KA;

XX WPI; 1998-169168/15.

DR N-PSDB; AAV26282.

XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.

XX Example 1; Page 64-66; 137pp; English.

XX The present sequence represents a recombinant neurotoxin protein from the
XX present invention. The present invention describes recombinant neurotoxin
XX proteins which comprise a first and second domain, where the first domain
XX is adapted to cleave one or more vesicle or plasma-membrane associated
XX proteins essential to exocytosis, and where the second domain is adapted:
XX (a) to translocate the protein into a cell; (b) to increase the
XX solubility of the protein compared to the solubility of the first domain
XX on its own, or (c) both to translocate the protein into a cell and to
XX increase the solubility of the protein compared to the solubility of the
XX first domain on its own, the protein being free of clostridial neurotoxin
XX (CN) and free of CN precursor that can be converted into toxin by
XX proteolytic action. The recombinant proteins can be used as therapeutic
XX agents for targeting cells expressing a relevant substrate. The products
XX can also be used as immunogens and as non-toxic standards for the
XX assessment and development of in vitro assays for the detection of
XX functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX environmental samples

SQ Sequence 878 AA;

AAW56010 Length: 878 August 31, 2004 14:39 Type: P Check: 4601 ..
Found using 'seq23' (hayes346.key)

1 MQFVNKQFNKDPVNGVDIAYIKIPNAGQMPVKAFKIHNKIWIPIERDTFTNPEEGDLN
21 24

61 PPPEAKQVPVSYD

```
...
135 INVIQPDGSRSEELNLVIIGPSADIIQFECKSFGEVLNLTNRNGYSTQYIRFSPDFTF
      |--|
      185
195 GFESLEVDNPLLGAGKFPATDPAVTLAHELHAGHRLYGIAINPNRVKVNTRYEMTS
      |--|
      233
255 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKFQDIAGTLNKAKSIVGTWTASLQYMK
      |--|
      287
315 NVFKEKYLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKFFKVLNRKTKYLNFDKAVF
      |--|
      342
375 KINIVPKVNYTIYDGFNLRLNTLNAANFNGQNTENNMMFTKLNKFTGLFEFYKLLCVRG
      |--|
      384
435 ITSKTKSLDKGYNKIEGRCDGALNDLCIKVNNWDLFFSPSBDNFTNDLNKGEIITSDTNI
      |--|
      446
495 EAAEENISLDLIQQYLFNFEDNEPENISLENSSDIIGQLELMPNIBRFPNGKKYELDK
      |--|
      510
555 YTMFHLRAQEFHGKSRIALTNSVNEALLNPSRVYTFSSDYVKKVNKATEAAMFLGWV
      |--|
      590
615 EQLVYDFDTETSEVSTDKIADITIIPY
      |--|
      717
667 GAVILLEFIPEITAIPVLGTFALVSYANKVLTAVQTIDNALSXRNEKWDDEVYKVIYTNMLA
      |--|
      758
727 KVNQTIDLRKKVKEALENQAEATKAIINYNQYITEEKNINFNIDDLSSKLNESINK
      |--|
      758
787 AMININKFLNQCSVSLMNSMIPYG
      |--|
      758
...
17 matches found in sequence:
aaw56011 : Recombinant botulinum neurotoxin type A LFxa/3H423/A-IGF-1.
(from 'bt_ags.pep')
TOIG of: aaw56011 check: 2660 from: 1 to: 953
ID AAW56011 standard; protein; 953 AA.
XX
AC AAW56011;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A LFxa/3H423/A-IGF-1.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
XX OS Clostridium botulinum.
XX
```

```
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
PI Shone CC, Quinn CP, Foster KA;
XX WPI; 1998-169168/15.
XX DR N-PSDB; AAV26283.
XX
PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 1; Page 70-73; 137pp; English.
XX
CC The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 953 AA;
AAW56011 Length: 953 August 31, 2004 14:39 Type: P Check: 2660 ..
Found using 'seq23' (hayes346.key)
1 MQFVNKQFNKDPVNGVDIAYIKIPNAGQMOPVAKFIHNKIWIPIERDTFTNPEGDIN
      |--|
      21 24
61 PPPEAKQVPVSYDD
...
135 INVIQPDGSRSEELNLVIIGPSADIIQFECKSFGEVLNLTNRNGYSTQYIRFSPDFTF
      |--|
      185
195 GFESLEVDNPLLGAGKFPATDPAVTLAHELHAGHRLYGIAINPNRVKVNTRYEMTS
      |--|
      233
255 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKFQDIAGTLNKAKSIVGTWTASLQYMK
      |--|
      287
315 NVFKEKYLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKFFKVLNRKTKYLNFDKAVF
      |--|
      342
375 KINIVPKVNYTIYDGFNLRLNTLNAANFNGQNTENNMMFTKLNKFTGLFEFYKLLCVRG
      |--|
      384
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387
103 KTSKSLDKGYNKIEGRCDGALNDLCIKVNNWDLFFSPGSDNFTNLDNKGEETSDTNI
446
435 EAAEENISLDLIQQYLYLTFFDNFENEPENISNIENSSDIIGQLELMPNTERFNGKKYELDK
510
495 YTMFHYLRAQFEHKGSRIALTNSVNEALLNPSRVYTFSSDYVKKVKKATEAAMFLGW
555 555 560
615 EQLVYDFDTESEVSTTDKIADITIIIPY
...
667 GAVILLEFIPEIAPVLGTFALVSIANKVLTVQTDIDNLSKRNEKWDVYKYIVTNWLA
717
727 KVTQIDLRKMKALENOAEATKAIINYQYQTEEEKNNINFNIDDLSSKLNESINK
758
787 AMININKFLNQC SVSYLMNSMIPYG
...
17 matches found in sequence:
aaw56012; Recombinant botulinum neurotoxin type A LFXa/3H423/A-CtxA 14.
TOIG of: aaw56012 check: 9225 from: 1 to: 907

ID AAW56012 standard; protein; 907 AA.
XX
AC AAW56012;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A LFXa/3H423/A-CtxA 14.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
XX
PR 13-DEC-1996; 96GB-00025996.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
PI Shone CC, Quinn CP, Foster KA;
XX
DR WPI; 1998-169168/15.
DR N-FSDS; AAW26284.
XX
PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 1; Page 77-79; 137pp; English.
XX
CC The present sequence represents a recombinant neurotoxin protein from the

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```

CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 907 AA;

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AAW56012 Length: 907 August 31, 2004 14:39 Type: P Check: 9225 ..
Found using 'seq23' (hayes346.key)

1 MQFVNKQFNVKDPVNGVDIAYIKIPNAGQMPVKAFKIHNKIWIPIERDTFTNPEGDLN
21 24
61 PPPEAKQVPVSYVD
...
135 INVIPDGSYRSEELNLVIGPSADIIFQCKSGHGVNLNTRNGYQSTQYIRFSPDFTF
185
195 GFEESLEVDNTPLLGAGKFPATPAVTIAHLIAGHRLYGIATNPVRVFNKVTNAYEMS
233
255 GLEVSPEELRTFGHDAKFIDSLQENEFRLYYNKFKDIASTLNKAKSIVGTASLQYMK
287
315 NVFKKYLSEDTSGKFSVDKLFKDKYKMLTEIYTEDNFVFKFKVNLNPKTKYINFDKAVF
342
375 KINIVPKVNYTYIDGFNLNLTNLAANFNGQNTNINNMNFTKLKNFTGLFEFYKLLCVRGI
384 387
435 ITSKTSLDKGYNKIEGRCDGALNDLCIKVNNWDLFFSPGSDNFTNLDNKGEETSDTNI
446
495 EAAEENISLDLIQQYLYLTFFDNFENEPENISNIENSSDIIGQLELMPNTERFNGKKYELDK
510
555 YTMFHYLRAQFEHKGSRIALTNSVNEALLNPSRVYTFSSDYVKKVKKATEAAMFLGW
555 560
615 EQLVYDFDTESEVSTTDKIADITIIIPY
...
667 GAVILLEFIPEIAPVLGTFALVSIANKVLTVQTDIDNLSKRNEKWDVYKYIVTNWLA
717

```

727 KUNTQIDLRKKKEALENQAATKALINQYQNYQYTEEEKNNINFNIDDLSSKLNESINK
758

787 AMININKFLNQCSVSYLMNSMIPYG

19 matches found in sequence:

aw56013 ; Recombinant botulinum neurotoxin type A LFXa/3H423/A-ZZ.
(from "bt_ags.pep")
TOIG of: aw56013 check: 4003 from: 1 to: 1013

ID AAW56013 standard; protein; 1013 AA.

XX AAW56013;

XX 27-JUL-1998 (first entry)

XX Recombinant botulinum neurotoxin type A LFXa/3H423/A-ZZ.

XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX detection; tetanus; non-toxic; toxin.

XX Synthetic.

XX Clostridium botulinum.

XX WO9807864-A1.

XX 26-FEB-1998.

XX 22-AUG-1997; 97WO-GB002273.

XX 23-AUG-1996; 96GB-00017671.

XX 13-DEC-1996; 96GB-00025996.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX (SPEY-) SPEYWOOD LAB LTD.

XX Shone CC, Quinn CP, Foster KA;

XX WPI; 1998-169168/15.

XX N-PSDB; AAV26285.

XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
XX immunogens or as non-toxic standards for the detection of neurotoxins.

XX Example 1; Page 83-86; 137pp; English.

XX The present sequence represents a recombinant neurotoxin protein from the
XX present invention. The present invention describes recombinant neurotoxin
XX proteins which comprise a first and second domain, where the first domain
XX is adapted to cleave one or more vesicle or plasma-membrane associated
XX proteins essential to exocytosis, and where the second domain is adapted:
XX (a) to translocate the protein into a cell; (b) to increase the
XX solubility of the protein compared to the solubility of the first domain
XX on its own, or (c) both to translocate the protein into a cell and to
XX increase the solubility of the protein compared to the solubility of the
XX first domain on its own, the protein being free of clostridial neurotoxin
XX (CN) and free of CN precursor that can be converted into toxin by
XX proteolytic action. The recombinant proteins can be used as therapeutic
XX agents for targeting cells expressing a relevant substrate. The products
XX can also be used as immunogens and as non-toxic standards for the
XX assessment and development of in vitro assays for the detection of
XX functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX environmental samples

XX Sequence 1013 AA;

AAW56013 Length: 1013 August 31, 2004 14:39 Type: P Check: 4003 ..
Found using 'seq23' (hayes346.key)

1 MOPVNRQFNYPKDPVNGVDIAYIKIPNAGOMQPVKAFKIHKNKIWIPIERDTFTNPEGDNL
21 24

61 PPPEAKQVPVSYD

...

135 INVIQDGSYRSEELNLIIGPSADIIQPECKSGFGEVLNMLTRNGYSTQYIRFSPDFTF
185

195 GFESLEVDTNPLLGAGKFATPAVTLAHLIHAHRLYGIALNPNRNVFKVNTNAYEMS
233

255 GLEVSPEELRTFGHDAKFIDSLQENEFRLYYNKKFKDIASTLNKAKSIVGTITASLOYMK
287

315 NVFKEKYLLEDGTSKFSVDKLFKDFKLYKMLTEIYTDNFVFKFKVLNRRKTYLNFDAVF
342

375 KINIVPKVNTIYDGFENLRNTNLAANFNGQNTENNNTKLNFTGLFEBFYKLLCVRGI
384

435 ITSKTSLDKYGNKIEGRCDGALNDLCIKVNNWDLFFSPSEDNFTDLNKGEITSNTI
446

495 EAARENISLDLIQQYYLTFFNEDPENISIENTLSSDIIGQLLELMPNTERPENGKYYELDK
510

555 YTMFHYLRAQEFERHKGSRIALTNSVNEALLNPSRVYTFSSDYVKVKNKATEAAMFLGW
555 560

615 EQLVYDTDETSEVSTTDKIADIIIPY

...

667 GAVILLEFPIEIAIPVLGTFFALVSIAKVKLTQTDIDNALSKEKDEVKYIVTNWLA
717

727 KVTQIDLRKKKEALENQAATKALINQYQNYQYTEEEKNNINFNIDDLSSKLNESINK
758

787 AMININKFLNQCSVSYLMNSMIPYG

...

859 QLSKYVDNQRLLSTFTEYIKSLNSPGAHAQAQDEAVDNKFNKEQONAFYELLHLPLNLN
909

919 EQRNFIQSLKDDPSQSANLAEAKKLNDAAQAPKVDNKNFNKEQONAFYELLHLPLNLEE
967

979 QRNFIQSLKDDPSQSANLAEAKKLNDAAQAPKVD

7 matches found in sequence:
aw56014 ; Recombinant botulinum neurotoxin type B LH107/B.
(from "bt_ags.pep")
TOIG of: aw56014 check: 8055 from: 1 to: 548

ID AAW56014 standard; protein; 548 AA.
AC AAW56014;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type B LH107/B.
XX
DE Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
EN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
XX Shone CC, Quinn CP, Foster KA;
PI WPI; 1998-169168/15.
XX N-PSDB; AAV26286.
DR
XX
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 2; Page 103-104; 137pp; English.
XX
XX The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 548 AA;

AAW56014 Length: 548 August 31, 2004 14:39 Type: P Check: 8055 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNFNNDPIDNNNIMWPPFARGTGYKAKFKITDRIWIIPRYTFGYKPDFN
33 36
34 37
61 KSSGIFNRDVCYEYDPDYINTMDKNI
...
149 ERKKGIFANLIIFGPGPVLNENETIDIGIQNHFASREGFGGIMQMKPCPEYVSFNNVQE
199

209 NKGASIPNRRGYFSDPALIIMHLEIHLVHGLYGIKVDLPIVPNEKFFMQSTDAIQAE
269 LYTFGGQDPSIITPSTDKSYDKVLQNFGRGIVDRLNKVLVCISDPNININIKYKFKDKY
289
329 KFYDESEGKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKNLLD
331
349
389 NEIYTIIEGFNISDKDMEKEYRCQNKAINQAYEEISKEHLAVYKIQMCKSVKAPGICID
421
449 VDNEDLFFIADKNSFSDLSKNERIE
...

18 matches found in sequence:
aaw56015 ; Recombinant botulinum neurotoxin type A 23LH423/A (Q2E,N26K,A27Y).
(from "bt ags.pep")
TOIG of: aaw56015 check: 3595 from: 1 to: 894
ID AAW56015 standard; protein; 894 AA.
XX
XX AAW56015;
AC
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A 23LH423/A (Q2E,N26K,A27Y).
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
XX Shone CC, Quinn CP, Foster KA;
PI WPI; 1998-169168/15.
DR N-PSDB; AAV26287.
XX
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 1; Page 39-42; 137pp; English.
XX
XX The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products

CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 894 AA;
AAW56015 Length: 894 August 31, 2004 14:39 Type: P Check: 3595 ..
Found using 'seq23' (hayes346.key)

```
1  GSPGIHMTSTRLQKLEFELPGTGMFVKQFNKYKDPVNGVDIAYIKIPKYGOMQPVKAFK
    |--| |--| |--|
    44 47 50 53

61  IHNKIWIPIERTFTNPEEGDLNPPPEAKQVPVSYDSTVLST

...

158  INVIQDGSYRSEELNLVIIGPSADIIOPECKSPGHEVLNLTNRNGYSGTOYIRFSPDFTF
    |--|
    208

218  GFESLEVDTNPLIGAGKATDPATVLAHELHAGHRLYGIAINPNRVFKVNTNAYYEMS
    |--| |--|
    256 273

278  GLEVSFELRTFGHDAKFIDSLQENEFRLYYNKFDFKDIASITLNKAKSIVGTTASLQYMK
    |--|
    310

338  NVFKEKYLSEDTSKFSVDKLEKFDKLYKMLTEIYTEDNFVKFVLNKRKTYLNFDRKAVF
    |--| |--|
    365 389

398  KINIVPKVNTIYDGFNLRTNLTNLAANFNGQNTNINNMNFTKLKNFTGLFIFYKLICVRGI
    |--| |--|
    407 410 449

458  ITSKTSLDKGNKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEEITSDTNIEAAEENI
    |--|
    469

518  SLDLIQIYLTFTNFDNEPENISLENLSDIICQLELMPNIEFRFNGKKYKLDKTYMFHYL
    |--| |--|
    526 571 576

578  RAQFEHCKSRIALTNSVNEALLNPSRVYTFSSDYVKVKVKATEAAMFLGWVEQLVYDF
    |--|
    579 606

638  TDETSEVSTTDKIADITILIPY

...

683  GAVILLEPIEIPALVGLTFALVSIANKVLTVQIDNALSKRNEKWDVYKIYTNWLA
    |--|
    733

743  KVTQIDLIRKKWKEALENQAETKAIINQVYQVTEBEKNNINFINIDLSSKLNESINK
    |--|
    774

803  AMININKFLNQC SVSYLMSMIPYG

...

18 matches found in sequence:
aaw56016 ; Recombinant botulinum neurotoxin type A 2LH423/A (Q2E,N26K,A27Y).
(from "bt_ags.pep")
TOIG of: aaw56016 check: 1709 from: 1 to: 873
```

```
ID AAW56016 standard; protein; 873 AA.
XX
AC AAW56016;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A 2LH423/A (Q2E,N26K,A27Y).
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
XX 22-AUG-1997; 97WO-GH002273.
XX
XX 23-AUG-1996; 96GB-00017671.
XX
XX 13-DEC-1996; 96GB-00025996.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX (SPEY-) SPEYWOOD LAB LTD.
XX
XX Shone CC, Quinn CP, Foster KA;
XX
XX WPI, 1998-169168/15.
XX
XX N-PSDB; AAV26288.
XX
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
XX immunogens or as non-toxic standards for the detection of neurotoxins.
XX
XX Example 1; Page 45-48; 137pp; English.
XX
XX The present sequence represents a recombinant neurotoxin protein from the
XX present invention. The present invention describes recombinant neurotoxin
XX proteins which comprise a first and second domain, where the first domain
XX is adapted to cleave one or more vesicle or plasma-membrane associated
XX proteins essential to exocytosis, and where the second domain is adapted:
XX (a) to translocate the protein into a cell; (b) to increase the
XX solubility of the protein compared to the solubility of the first domain
XX on its own, or (c) both to translocate the protein into a cell and to
XX increase the solubility of the protein compared to the solubility of the
XX first domain on its own, the protein being free of clostridial neurotoxin
XX (CN) and free of CN precursor that can be converted into toxin by
XX proteolytic action. The recombinant proteins can be used as therapeutic
XX agents for targeting cells expressing a relevant substrate. The products
XX can also be used as immunogens and as non-toxic standards for the
XX assessment and development of in vitro assays for the detection of
XX functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX environmental samples
XX
XX Sequence 873 AA;
XX
AAW56016 Length: 873 August 31, 2004 14:39 Type: P Check: 1709 ..
Found using 'seq23' (hayes346.key)
```

```
1  GSMEFVNQFNKYKDPVNGVDIAYIKIPKYGOMQPVKAFKIHNIWIPIERTFTNPEEGD
    |--| |--|
    23 26 29 32

61  LNPPPEAKQVPVSYDSTVLST

...

137  INVIQDGSYRSEELNLVIIGPSADIIOPECKSPGHEVLNLTNRNGYSGTOYIRFSPDFTF
    |--|
    187
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```

XX 07-DEC-1998 (first entry)
XX Clostridium botulinum toxin E C fragment.
DE Antitoxin; vaccine; neurotoxin; toxin E; intoxication; immunogen;
XX botulism; BotE.
XX Clostridium botulinum; serotype E strain NCTC 11219.
OS Synthetic.
XX
XX Key Location/Qualifiers
XX Peptide 1..21
XX /note= "N-terminal His tag"
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30588.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
XX botulinum type B or E toxin - useful to treat humans and other animals at
XX risk of intoxication with clostridial toxin.
XX
XX Example 41; Page 327-329; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
XX Clostridium botulinum (NCTC 11219) type E neurotoxin, encoded by a DNA
XX sequence (see AAV30588) in plasmid pETHisB. This vector is used to
XX express BotE soluble C fragment in Escherichia coli host cells, and the
XX recombinant C fragment was purified on an affinity column. The invention
XX relates to recombinant proteins derived from C. botulinum toxins,
XX especially type B and type E toxins. Methods are provided which allow for
XX the isolation of soluble recombinant proteins free of significant
XX endotoxin contamination. Preferred hosts for production of recombinant
XX proteins are E. coli, insect cells and yeast cells. The recombinant
XX toxins are used as immunogens for the production of vaccines and
XX antitoxins that are useful in the treatment of humans and animals at risk
XX of intoxication with clostridial toxin
XX
XX Sequence 452 AA;
XX
AAW68396 Length: 452 August 31, 2004 14:39 Type: P Check: 4403 ..
Found using 'seq23' (hayes346.key)
...
55 MRYKNDKYVDTSGYDSNININGDVVKYPTKNQFGIDNDKLSEVNISQNDYIYDNKYKN
105 112
115 FSISFWRIIPNYDNKIVNVNNEYTTINCRCNNSGWKSLNHNIEIWLQDNAGINQKIA
137
175 FNYGNANGISDYINKWIFVTITNDRIGDSKLYINGNLIDQKXILNLGNHVS DNILFKIV
177
235 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNBPNTILKDFWGNLYLDYKEYLLNLKP
238 246
239 246

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241
295 NNFIDRRKOSTLSINNIRSTILLANRLYSGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
322
355 SKTHLFLPYADYATTNKEKTIKISSGNRPNQVVMNSVGNCTMNFKNNGNIGLLGF
415 KADTVVASTWYTHMRDHTNSNGCFWNFISEHGQEK
426
-----
13 matches found in sequence:
aaw68397 ; Clostridium botulinum type C1 toxin C fragment.
(from "bt_ags.pep")
TOIG of: aaw68397 check: 2269 from: 1 to: 462
ID AAW68397 standard; protein; 462 AA.
XX
XX AAW68397;
XX
XX 07-DEC-1998 (first entry)
XX Clostridium botulinum type C1 toxin C fragment.
XX
XX Antitoxin; vaccine; neurotoxin; toxin C; intoxication; immunogen;
XX botulism; BotC.
XX
XX Clostridium botulinum; serotype C1 strain Stockholm.
XX Synthetic.
XX
XX Key Location/Qualifiers
XX Peptide 1..21
XX /note= "N-terminal His tag"
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30588.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
XX botulinum type B or E toxin - useful to treat humans and other animals at
XX risk of intoxication with clostridial toxin.
XX
XX Example 45; Page 339-341; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
XX Clostridium botulinum (Stockholm strain) type C1 neurotoxin, encoded by a
XX DNA sequence (see AAV30588) in plasmid pETHisB. This vector is used to
XX express BotC soluble C fragment in Escherichia coli host cells, and the
XX recombinant C fragment was purified on an affinity column. The invention
XX relates to recombinant proteins derived from C. botulinum toxins,
XX especially type B and type E toxins. Methods are provided which allow for
XX the isolation of soluble recombinant proteins free of significant
XX endotoxin contamination. Preferred hosts for production of recombinant
XX proteins are E. coli, insect cells and yeast cells. The recombinant
XX toxins are used as immunogens for the production of vaccines and
XX antitoxins that are useful in the treatment of humans and animals at risk
XX of intoxication with clostridial toxin
XX
XX Sequence 462 AA;
XX

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```
AAW68397 Length: 462 August 31, 2004 14:39 Type: P Check: 2269 ..
Found using 'seq23' (hayes346.key)
...
52 NTLVDTSGYNAEVSEGDVQLNFIPIPFDFKLGSSGDRGKVIIVTONENIVNSMYESFSI
   102 106
   |--|
   |--|
112 SFWRINKWVSNLPVGTIIDSVKXNNSGWSIGLIISNLFVTLKQNEDESEQINFSYDISNN
   127
172 APGYKWFVFTVTNNMGNMKIYINGKLIDTIKVKELTGINFSTIITEINKIPDTGLIT
   175
232 SDSDNINMWIRDFYIFAKELDGKDGINILFNSLQYTNVVKDYWGNDLRYNKEYYNVNDYL
   245 265
   |--|
   |--|
292 NRYMYANSRQIVFNTNRNNDNFEGYKIIKIRIGTNDTRVRGBDILYFDMTINNKAYN
   294 317 340 350
   |--|
   |--|
352 LFMKNETYADNHSTEDIYAGLEQTKDINDNIFQIQPMNNTYYASQIFKSNFNGEN
   353 396
412 ISGICSTGYRFLRGDWYRHNLYVPTVKQNYASLLESTSTHWGFVPVSE
   444
-----
9 matches found in sequence:
aaw68398 ; Clostridium botulinum type D toxin C fragment.
(from "bt_ags.pep")
TOIG of: aaw68398 check: 8451 from: 1 to: 451
ID AAW68398 standard; protein; 451 AA.
XX
AC AAW68398;
XX
XX DT 07-DEC-1998 (first entry)
XX
XX DE Clostridium botulinum type D toxin C fragment.
XX
XX KW Antitoxin; vaccine; neurotoxin; toxin D; intoxication; immunogen;
XX KW botulism; BoED.
XX
XX OS Clostridium botulinum; serotype D.
XX OS Synthetic.
XX
XX PE key Location/Qualifiers
XX FT Peptide 1..21
XX FT /note= "N-terminal His tag"
XX
XX FN WO9808540-A1.
XX
XX PD 05-MAR-1998.
XX
XX PF 28-AUG-1997; 97WO-US015394.
XX
XX PR 28-AUG-1996; 96US-00704159.
XX
XX PA (OPHI-) OPHIDIAN PHARM INC.
XX
XX PI Williams JA, Thalley BS;
XX
XX DR WPI; 1998-230234/20.
XX
XX DR N-PSDB; AAV30591.
```

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XX
PT Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX PS Example 47; Page 352-353; 428pp; English.
XX
XX CC This is the amino acid sequence of the histidine-tagged C fragment of
XX CC Clostridium botulinum seotype D neurotoxin, encoded by a DNA sequence
XX CC (see AAV30591) in plasmid pETHisB. This vector can be used to express
XX CC BoED soluble C fragment in Escherichia coli host cells, with the
XX CC recombinant C fragment being purified on an affinity column. The
XX CC invention relates to recombinant proteins derived from C. botulinum
XX CC toxins, especially type B and type E toxins. Methods are provided which
XX CC allow for the isolation of soluble recombinant proteins free of
XX CC significant endotoxin contamination. Preferred hosts are E. coli, insect
XX CC cells and yeast cells. The recombinant toxins are used as immunogens for
XX CC the production of vaccines and antitoxins useful in the treatment of
XX CC humans and animals at risk of intoxication with clostridial toxin
XX
XX SQ Sequence 451 AA;
AAW68398 Length: 451 August 31, 2004 14:39 Type: P Check: 8451 ..
Found using 'seq23' (hayes346.key)
...
49 NKNALVDTSGYNAEVVRGDNVQLNTIYTNDFKLSSGDKLIIVLNNNNILYSAIYENSSV
   99 102
   |--|
109 SFWIKISKDLTNSHNEYTIINSIEQNSGWLKIRNGNIEWILOQDVNRKYSLIFDYSSEL
   125 157
   |--|
169 SHTGYTNKWFVFTITNNIMGYMKLYINGELKQSQKIEDLDEVKLDKTIIVFGIDENIDENQ
   189
229 MLWIRDFNIFSKELSNEDINIVYEQILRNVIKDYWGPNLKFDEYTYIINDYIDRYIAP
   274
289 ESNLLVLVRYPDRSKLYTGNFTIKSVSDKNPYSKILNGDNILHMLYNSKYMIRDTD
   321 341
   |--|
349 TIYATQGECSQNCVYALKQSNLGNYGIGIFSIKNIVSKNKYCSQIFSSPRENTMLLAD
   410 421
   |--|
409 IYKWRFTSFKNAYTPVAVTNVYETKLLSTSSFWKFTISRDPGWVE
   410 421
-----
15 matches found in sequence:
aaw68399 ; Clostridium botulinum type F toxin C fragment.
(from "bt_ags.pep")
TOIG of: aaw68399 check: 8786 from: 1 to: 448
ID AAW68399 standard; protein; 448 AA.
XX
XX AC AAW68399;
XX
XX DT 07-DEC-1998 (first entry)
XX
XX DE Clostridium botulinum type F toxin C fragment.
XX
XX KW Antitoxin; vaccine; neurotoxin; toxin F; intoxication; immunogen;
XX KW botulism; BotF.
XX
XX OS Clostridium botulinum; serotype F strain 202F (ATCC 23387).
XX OS Synthetic.
XX
```


CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting
CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 254 AA;

AAY30117 Length: 254 August 31, 2004 14:39 Type: P Check: 7360 ..
Found using 'seq23' (hayes346.key)
...
66 GLEWIGRIDPANGNTEYDPKFOGKATITADTSNTVNLQLSLTSIEDTAVYYCAGSGELG
116
126 FPYWGQTLVTVSAKTTPEPSVPLAPGSAQTNSMTVLGCLVKGYFPEPVTVTWNSGSL
148
186 SSGVHTFPVAVLOFDLY
...

1 match found in sequence:
aay30118 ; Murine anti-botulinum toxin antibody fragment (BotFab 1) light chain
(from "bt_ags.pep")
TOIG of: aay30118 check: 3248 from: 1 to: 233

ID AAY30118 standard; protein; 233 AA.
XX
AC AAY30118;
XX
DT 20-OCT-1999 (first entry)
XX
DE Murine anti-botulinum toxin antibody fragment (BotFab 1) light chain.
XX
KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
KW Clostridium botulinum; detection.
XX
OS Mus musculus.
XX
PN US5932449-A.
XX
PD 03-AUG-1999.
XX
PF 30-JAN-1997; 97US-00792824.
XX
PR 01-FEB-1996; 96US-0011013P.
XX
PA (USSA) US SEC OF ARMY.
XX
PI Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
XX
DR WPI: 1999-492692/41.
DR N-PSDB; AAX86665.
XX
PT Detection of botulinum toxin.
XX
PS Claim 8; Col 25-26; 24pp; English.
XX
CC This sequence represents the light chain of BotFab 1, a murine
CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC and B. A cDNA library was made from mouse mRNA isolated from mice
CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC chains were expressed in phage display libraries and screened for their
CC ability to bind to botulinum toxin types A or B. The clones were then
CC isolated and sequenced. Botulinum neurotoxin is produced as several
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting

CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting
CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 233 AA;

AAY30118 Length: 233 August 31, 2004 14:39 Type: P Check: 3248 ..
Found using 'seq23' (hayes346.key)
...
4 LLPTRAAGLLLLAQPAMADIQMTQSPASLSASVGETVITTCRASGNIHNYLAWYQQKQG
54 57
64 KSPQLLVYNAKTLADGVPSRFRSGSGSGTQYSLKINSLOPEDFGS
...

3 matches found in sequence:
aay30119 ; Murine anti-botulinum toxin antibody fragment (BotFab 1) heavy chain
(from "bt_ags.pep")
TOIG of: aay30119 check: 7873 from: 1 to: 254

ID AAY30119 standard; protein; 254 AA.
XX
AC AAY30119;
XX
DT 20-OCT-1999 (first entry)
XX
DE Murine anti-botulinum toxin antibody fragment (BotFab 1) heavy chain.
XX
KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
KW Clostridium botulinum; detection.
XX
OS Mus musculus.
XX
PN US5932449-A.
XX
PD 03-AUG-1999.
XX
PF 30-JAN-1997; 97US-00792824.
XX
PR 01-FEB-1996; 96US-0011013P.
XX
PA (USSA) US SEC OF ARMY.
XX
PI Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
XX
DR WPI: 1999-492692/41.
DR N-PSDB; AAX86665.
XX
PT Detection of botulinum toxin.
XX
PS Claim 8; Col 25-27; 24pp; English.
XX
CC This sequence represents the heavy chain of BotFab 1, a murine
CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC and B. A cDNA library was made from mouse mRNA isolated from mice
CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC chains were expressed in phage display libraries and screened for their
CC ability to bind to botulinum toxin types A or B. The clones were then
CC isolated and sequenced. Botulinum neurotoxin is produced as several
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting


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112 112 NFWVTPKYNNDIQYLONEYTIISCIKNDGKWSIKGNRIIWTLDVNAKSKGIFFE
172 172 YSIKDNISDYINKWF
...
232 232 TDTTFKFWINDENIFGRELNATEVSSLYWQSSTNLTKDFWGNPLRYDQYLYFNQGMQN
292 292 IYIKFYSKASMGETAPRTNFNNAINYQNYLYLGLRFIIKASNSRNINNDNIVREGDYIV
352 352 LNIDNISDSRYVYVLVNSKEIQTLFLAPINDDPYFDVLQIKKYERTYNQCILCEK
412 412 DTKTGLFGIGKFDYGVWBDYDNYFCISQWYLRRISININKLRLGNCWOFIPVDEGW
472 472 TE
-----
30 matches found in sequence:
aay05814 ; Non-toxic modified botulinum toxin rBoNT/C.
(from "bt_ags pep")
TOIG of: aay05814 check: 3136 from: 1 to: 1291

ID AAY05814 standard; protein; 1291 AA.
XX AC AAY05814;
XX AC AAY05814;
DT 02-AUG-1999 (first entry)
XX DE Non-toxic modified botulinum toxin rBoNT/C.
XX KW Botulinum toxin; botulism; rBoNT/C; vaccine; drug delivery; mutant.
XX OS Clostridium botulinum.
XX OS Synthetic.
FH Key Location/Qualifiers
FT Misc-difference 229 /note= "His in native toxin"
FT Misc-difference 230 /note= "Glu in native toxin"
FT Misc-difference 233 /note= "His in native toxin"
FT Misc-difference 233 /note= "His in native toxin"
XX PN WO9920306-A1.
XX PD 29-APR-1999.
XX PF 16-OCT-1999; 98WO-US021897.
XX PR 20-OCT-1997; 97US-00954302.
XX PA (UYJE-) UNIV JEFFERSON THOMAS.
XX PI Simpson L, Kiyatkin N, Maksymowych A;
XX

```

WPI; 1999-302646/25.
N-PSDB; AAX25521.
Modified toxin useful for systemic delivery of oral vaccines and therapeutic agents.
Example 1; Page 31-33; 37pp; English.

The present sequence represents a modified serotype C botulinum toxin, termed rBoNT/C, in which amino acids His-229, Glu-230 and His-233 of the native sequence are substituted by Gly, Thr and Asn, respectively, i.e. the zinc binding motif (see AAY05817) of the light chain holotoxin is modified, resulting in loss of endoprotease activity. DNA coding for the modified botulinum toxin (see AAX25521) was assembled from 3 separate toxin fragments using PCR and site-directed mutagenesis. The modified recombinant botulinum toxin maintains its ability to translocate from the gut into the general circulation but is non-toxic. It can be used as an oral vaccine for antigenic peptides including botulinum toxin (i.e. an oral vaccine for botulism) or for the oral delivery of other therapeutic agents to the general circulation

Sequence 1291 AA;
AAY05814 Length: 1291 August 31, 2004 14:39 Type: P Check: 3136 ..
Found using 'seq23' (hayes346.key)

```

...
152 INPSVIITGPENIIDPETSTFKLTNTTFAAQEGFALSIIISPRFMTYSNATNDVGE
212 GRFSKSEFCMDPILIMGTNNAMNLYGIALPNDQTISSTVTSNIFYSQYNVKLEVAYIY
272 AFGPTDILIPKSARKYFEKALDYRSIAKELNSITTANPSSFNKIYGEYKQKLIRKYR
332 FVVESSGEVTNRNKFVELYNELTOIFTEFNKAKLYNVQNRKIYLSNVYTPVTANILDDN
392 VYDIQNGFNIPKSNLNLVFMGQNLNRNPAKRKVPENMLYLF
...
466 IGDISDVKTDFLRKDINEETEVIYYPDNVSDQVILSKNTSEHGQDLPLPSIDSESEI
526 LPGENQVFDNRNTQNVYDLYNSXYLYLESQKLSDNVEDFTFTRSIIEALDNSAKVYTFPTL
586 ANKNAGVQGGFLMWANDVVEDEFTTNILRKDTLTKISDVSAIIPYIGPALNINSVRRG
646 NFTEAFATVGTGVTILLAEPEFTIPALGAFVIYSKVQERNEIKTIDNCLEQRIRKWKDSY
706 EWMGTWLSRIITQFNNISYQWYDLSNYQAGAKAIDLEVKYSGSGDKENIKSQVENLK
766 NSLDVKISEAMNNINKFIRECSVTYLFKNMLPKV
...

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FH Key Location/Qualifiers
PT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX
XX (OPHI-) OPHIDIAN PHARM INC.
XX
XX Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
XX
XX N-PSDB; AAV30593.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 48; Page 364-365; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (202F strain) type F neurotoxin, encoded by a DNA
CC sequence (see AAV30593) in plasmid pETHisB. This vector can be used to
CC express BotC soluble C fragment in Escherichia coli host cells, with the
CC recombinant C fragment being purified on an affinity column. The
CC invention relates to recombinant proteins derived from C. botulinum
CC toxins, especially type B and type E toxins. Methods are provided which
CC allow for the isolation of soluble recombinant proteins free of
CC significant endotoxin contamination. Preferred hosts for production of
CC recombinant proteins are E. coli, insect cells and yeast cells. The
CC recombinant toxins are used as immunogens for the production of vaccines
CC and antitoxins that are useful in the treatment of humans and animals at
CC risk of intoxication with clostridial toxin
XX
XX Sequence 448 AA;
XX
AAW68399 Length: 448 August 31, 2004 14:39 Type: P Check: 8786 ..
Found using 'seq23' (hayes346.key)
1 MGHHHHHHHHHSSGHIEGRHMASMAILIYFNRLYKKIKOSSILDMRYENKFKIDISGY
36 39
61 GSNISINGNVVIYSTNRNQFGIYNSRLSEVNIAQNNDIYNSRYONFSISFWVRIPKHYK
104
121 PMHNHREYTIINCMMGNNSGWKISLRTVRDCEIITWLQDTSGNKENLIFRYEELNRSNY
122 128
171
181 INKWIFVTITNRLGNSRIYNGNLIVKESISNLGDIHVSNDILFKIVGCDDETGVGRY
235 240
241 PKVFNTELDKTEIETLYSNEDPPSILKNWGNLYLNKKYLFNLRLKDKYITLNSGILN
243
301 INQRGVTEGSVFLNKLGYEGVEVIIRKNGPIDISNTDNFVRKNDLXINVDRGVEYRL
316
319
361 YADTKSEKEKIIRTSNLDLSGLIIVMDSIGNNCTMNFQNNNGSNIGLLGFHSHNNLVASS
361
```

```

421 WYNNIRRTSSNGCFWSSISKENGWKE
423
-----
14 matches found in sequence:
aaw68400 ; Clostridium botulinum type G toxin C fragment.
(from "bt_ags pep")
TOIG of: aaw68400 check: 9903 from: 1 to: 473
ID AAW68400 standard; protein; 473 AA.
XX
XX AAW68400;
XX
XX 07-DEC-1998 (first entry)
XX
XX Clostridium botulinum type G toxin C fragment.
XX
XX Antitoxin; vaccine; neurotoxin; toxin G; intoxication; immunogen;
XX botulism; BotG.
XX
XX Clostridium botulinum; serotype G strain 113/30.
XX
XX Synthetic.
XX
XX Key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX
XX (OPHI-) OPHIDIAN PHARM INC.
XX
XX Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
XX
XX N-PSDB; AAV30596.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 49; Page 376-378; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (113/30 strain) type G neurotoxin, encoded by a DNA
CC sequence (see AAV30596) in plasmid pETHisB. This vector can be used to
CC express BotG soluble C fragment in Escherichia coli host cells, with the
CC recombinant C fragment being purified on an affinity column. The
CC invention relates to recombinant proteins derived from C. botulinum
CC toxins, especially type B and type E toxins. Methods are provided which
CC allow for the isolation of soluble recombinant proteins free of
CC significant endotoxin contamination. Preferred hosts for production of
CC recombinant proteins are E. coli, insect cells and yeast cells. The
CC recombinant toxins are used as immunogens for the production of vaccines
CC and antitoxins that are useful in the treatment of humans and animals at
CC risk of intoxication with clostridial toxin
XX
XX Sequence 473 AA;
XX
AAW68400 Length: 473 August 31, 2004 14:39 Type: P Check: 9903 ..
Found using 'seq23' (hayes346.key)
...
52 RGRLLDSSGYGATWVGSDVIFNDIGNQFKLNNSNSNITAHQSKFVVYDSMFDFSI
---
```

```
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast
XX
XX SQ Sequence 450 AA;
AAY77136 Length: 450 August 31, 2004 14:39 Type: P Check: 8215 ..
Found using 'seq23' (hayes346.key)
...
40 NTLVDTSGYNAEVSEGDVQLNPIFPDFDKLGSGGEDRGKIVITQENIVNYSYFSI
    |--| |--| |--|
    90 93 94 97
100 SFWRINKVSNLPGYTIIDSVKXNSGWSIGIISNFLVTLKQNESEQSINFSDISNN
    |--| |--| |--|
    115
160 APGYNKWFVVTNNMGNMKIYINGKLIDTIKVKELTGINFSTITFEINKIPDTGLIT
    |--| |--| |--|
    163
220 SDSDNINMIRDFYIFAKELDGKDINILFNSLOVTVKDWGNDLRYNKYVNIIDYL
    |--| |--| |--| |--|
    233 253 271
280 NRYMYANSRQIVENTRRNNDFNEGKIIIRKIRGNTNDRVRGGDILYFDMTINNKAYN
    |--| |--| |--| |--|
    282 305 328 338
340 LEWKNETWADNHSTEDIYAIGLREQTKDINDNIIFOIQPMNNTYVYASQIFKSNFNGEN
    |--| |--| |--|
    341 384
400 ISGICSGTYRFLRGDGYRHNVLVPTVKQGNVSLLESTHMGFVPVSE
    |--| |--| |--|
    432
-----
12 matches found in sequence:
aay77137 ; Synthetic botulinum neurotoxin serotype E (BoNTE) C-terminal fragment
(from "bt_ags.pep")
TOIG of: aay77137 check: 2298 from: 1 to: 449
ID AAY77137 standard; protein; 449 AA.
XX
AC AAY77137;
XX
XX
DT 08-MAY-2000 (first entry)
XX
DE Synthetic botulinum neurotoxin serotype E (BoNTE) C-terminal fragment.
XX Botulinum neurotoxin; heavy chain; BoNT; serotype E; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
XX diagnosis; drug screening.
XX Clostridium botulinum.
OS Synthetic.
XX WO200002524-A2.
PN
XX 20-JAN-2000.
PD
XX 09-JUL-1999; 99WO-US015570.
PF
XX 10-JUL-1998; 98US-0092416P.
PR
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PR 12-MAY-1999; 99US-0133870P.
XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX DR N-PSDB; AAZ87215.
XX
XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX
XX Claim 26; Page 43-44; 54pp; English.
XX
XX The invention relates to novel vaccines that induce a protective immune
XX response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
XX and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
XX DNA construct comprising a vector, and at least one nucleic acid fragment
XX comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
XX G. In preferred embodiments of the invention, the vector is a Venezuelan
XX equine encephalitis virus (VEE) replicon vector. Use of this vector
XX results in the production of large amounts of a protein encoded by a
XX sequence cloned into the replicon. The constructs are used to produce
XX vaccines against botulism. The proteins can also be used as diagnostic
XX tools for the diagnosis of botulism. The transformed host cells can be
XX used to analyse the effectiveness of drugs and agents which inhibit toxin
XX effects. The vaccine currently used against botulism is dangerous and
XX expensive to produce, and contains formalin, which is very painful for
XX the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
XX serotypes are represented in the formulation. The novel vaccine of
XX overcomes these problems, as it is easily purified, and available in
XX large quantities. It is also expressed in the lymph nodes for a better
XX immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
XX fragments used in the present invention. The DNA encoding these sequences
XX had been optimised for codon usage for expression in yeast
XX
XX SQ Sequence 449 AA;
AAY77137 Length: 449 August 31, 2004 14:39 Type: P Check: 2298 ..
Found using 'seq23' (hayes346.key)
...
52 MRYKNDKYVDTSGYSDNININGDVYKYPKNQFGIYNDKLTETLNISQNDYIIYDNKYKN
    |--| |--| |--| |--|
    102 109
112 FSISSFWRIPNYDNKIYVNNYEYTIINCMDNNNGKWSLNHNEIITWTLQDNAGINQKLA
    |--| |--| |--|
    112 134
172 FNYGANGISDYINKWIFVTIITNDRGLGSKLYINGNLIDQKSIILNLGNTHVSDNHLFKIV
    |--| |--| |--|
    174
232 NCSTYRYIGIRYENIFDKELDETEIQTLYSNPNTNLTDFWGNVLLYDKETVLLNLVLP
    |--| |--| |--| |--|
    235 243 276 283
    238
292 NNFIDRRKDTLSINNIRSTILLANRLYSKIKVQIQRVNNSSSTNDNLVKNQDVYINFA
    |--| |--| |--|
    319 346
352 SKTHLPPLYADTATTNKEKTIKISSGNRFNQVVMVNNVGNCTWFKNNNGNIGLLGF
412 KADTVVASTWYTYTHMRDHTNSGCFWNFISEHGWQEK
    |--| |--|
    423
-----
```

12 matches found in sequence:
aay77138 ; Synthetic botulinum neurotoxin serotype F (BoNTF) C-terminal fragment
(from "bt ags.pep")
TOIG of: aay77138 check: 7414 from: 1 to: 432

ID AAY77138 standard; protein; 432 AA.
XX AAY77138;
AC
XX
DT 08-MAY-2000 (first entry)
XX
DE Synthetic botulinum neurotoxin serotype F (BoNTF) C-terminal fragment.
XX
KW Botulinum neurotoxin; heavy chain; BoNT; serotype F; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
KW diagnosis; drug screening.
XX
OS Clostridium botulinum.
OS Synthetic.
XX
XX WO200002524-A2.
XX
XX
XX 20-JAN-2000.
XX
XX 09-JUL-1999; 99WO-US015570.
XX
XX 10-JUL-1998; 98US-0092416P.
XX
XX 12-MAY-1999; 99US-0133870P.
XX
XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX N-PSDB; AAZ87216.
XX
XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX
XX Claim 27; Page; 54pp; English.

CC The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast. Note: This
CC sequence is not given in the specification, but is decoded from the BoNTF
CC Hc DNA sequence given on pages 45-46
XX
XX Sequence 432 AA;

AAY77138 Length: 432 August 31, 2004 14:39 Type: P Check: 7414
Found using 'seq23' (hayes346.key)

1 MSYTNKILILYFNKLYKIKDNSILDYNNKFNKFDISGYSNIGSDVYIYSTRNQ

17 20

61 FGIYSSKPSVNTIAQNNDIIVNGRYQNFMSFWRIKPKYFNKNVLANNEYIIDCIRNNS
85 88
121 GWKISLNYNKLIIWTLDQTAGNNOKLNFVNTMISISDYINKKWFVTITNNRLGNSRIYIN
128 149
181 GNLIDEKSISNLGDIHSDNLFKIVGNCNDRYVGIKRYKVFDTLTKTEIETILYSDEPD
213 218
241 PSILKDFWGYLLNKKYIYLLNLLRTDKSITQNSFLNINQORGVQKPNFISNTRLYTG
251 258
301 VEFIIRKNGSTDISNTDNFVRKNDLAYINVVDRDVEYRLNADISIAKEPIKILRTSNS
301 327
361 NNSLGQIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFW
406
421 SPISKEHGWQEN

14 matches found in sequence:
aay77139 ; Synthetic botulinum neurotoxin serotype G (BoNTG) C-terminal fragment
(from "bt ags.pep")
TOIG of: aay77139 check: 8247 from: 1 to: 449
ID AAY77139 standard; protein; 449 AA.
XX
XX AAY77139;
XX
XX 08-MAY-2000 (first entry)
XX
XX Synthetic botulinum neurotoxin serotype G (BoNTG) C-terminal fragment.
XX Botulinum neurotoxin; heavy chain; BoNT; serotype G; C-terminal fragment;
XX Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
XX diagnosis; drug screening.
XX Clostridium botulinum.
XX Synthetic.
XX WO200002524-A2.
XX
XX 20-JAN-2000.
XX
XX 09-JUL-1999; 99WO-US015570.
XX
XX 10-JUL-1998; 98US-0092416P.
XX
XX 12-MAY-1999; 99US-0133870P.
XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX N-PSDB; AAZ87217.
XX
XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX
XX Claim 28; Page 47-48; 54pp; English.
XX
XX The invention relates to novel vaccines that induce a protective immune
XX response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F

CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC has been optimised for codon usage for expression in yeast
XX

SQ Sequence 449 AA;

AAY77139 Length: 449 August 31, 2004 14:39 Type: P Check: 8247 ..
Found using 'seq23' (hayes346.key)

...

28 RGRLLDSSGCGATMVGSDVIFNDIGNGQFKLNNSNSNITAHQSKFVYVDSMFNFSI
|---|
78 81

88 NFWRTPKYNNDIQTVLQNEYITLISCIKNDGKWSIKGNRIIWTLLIDVNAKSIFPE
|---|
109

148 YSIKDNISDVINKWF

...

208 TDTTKFWIKDFNIFGBELNATEVSSLIYWTQSNTNLKDFWGNPLRYDTQYILFNQGMQN
|---|
258

268 IYIKYFSKASMGSTAPRTNENNAINYQNLGLRPTIIKASNSRNNDNIVREGDIY
|---|
269 294 298 325 327

328 LINDNISDESRYVYVLVNSKEIQTLFLAPINDDPYFDVLQIKKYEKTYNCILCEK
|---|
328 330 338 341 365

388 DTKTGLGIGKFKVDYGVWDTYDNYFCISQWYLRISENINKLRLGCNWNQPIPVDEGW
|---|
404 411 414

448 TE

19 matches found in sequence:

ay77140 ; Native botulinum neurotoxin serotype A (BoNTA).
(from "bt_ags.pep")
TOIG of: aay77140 check: 6165 from: 1 to: 837

ID AAY77140 standard; protein; 837 AA.

XX AAY77140;

AC

XX

DT 08-MAY-2000 (first entry)
XX Native botulinum neurotoxin serotype A (BoNTA).
DE Botulinum neurotoxin; heavy chain; BoNT; serotype A;
XX Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
KW diagnosis; drug screening.
XX Clostridium botulinum.
XX
XX Key Location/Qualifiers
XX Misc-difference 837
XX /note= "Apparently encoded by GGATGGGGAG AAAGGCCACT G"
XX WO200002524-A2.
XX 20-JAN-2000.
XX 09-JUL-1999; 99WO-US015570.
XX 10-JUL-1998; 98US-0092416P.
XX 12-MAY-1999; 99US-0133870P.
XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX N-PSDB; AAZ87218.
XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX Example 3; Page 49; 54pp; English.
XX
XX The invention relates to novel vaccines that induce a protective immune
XX response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
XX and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
XX DNA construct comprising a vector, and at least one nucleic acid fragment
XX comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
XX G. In preferred embodiments of the invention, the vector is a Venezuelan
XX equine encephalitis virus (VEE) replicon vector. Use of this vector
XX results in the production of large amounts of a protein encoded by a
XX sequence cloned into the replicon. The constructs are used to produce
XX vaccines against botulism. The proteins can also be used as diagnostic
XX tools for the diagnosis of botulism. The transformed host cells can be
XX used to analyse the effectiveness of drugs and agents which inhibit toxin
XX effects. The vaccine currently used against botulism is dangerous and
XX expensive to produce, and contains formalin, which is very painful for
XX the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
XX serotypes are represented in the formulation. The novel vaccine of
XX overcomes these problems, as it is easily purified, and available in
XX large quantities. It is also expressed in the lymph nodes for a better
XX immune response. The present sequence represents the native BoNTA heavy
XX chain used in an exemplification of the present invention
XX
XX Sequence 837 AA;

AAY77140 Length: 837 August 31, 2004 14:39 Type: P Check: 6165 ..
Found using 'seq23' (hayes346.key)

1 MIKVNWDLFFSPSEDNFTNDLNKGEITSDNIRAEENISLDLIQQVYLTFNDFNEPE
|---|
50 53

61 NISINLSDDIIGQLELMPNTERFPNGKKYELDKYTMFHYLFAQBFHGKSRIALTNSVN
|---|
95 98 103

121 EALLNPSRVYITFFSSDYVKKNKATEAAMFLGWVEQLVYDFDTESEVSTTDKIADITII
|---|
130

| | | | |
|-----|-----|---|-------|
| 181 | IPY | 10-JUL-1998; 98US-0092416P. | PR |
| ... | | 12-MAY-1999; 99US-0133870P. | PR |
| 207 | | (USME-) US MEDICAL RES INST INFECTIOUS DISEASES. | XX |
| | | Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L; | PA |
| | | WPI; 2000-160827/14. | XX |
| | | N-PSDB; AAZ87219. | XX |
| 267 | | Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum toxin serotypes A-G, is used for inducing an immune response against botulinum. | XX |
| 327 | | Example 3; Page 51; 54pp; English. | PT |
| ... | | The invention relates to novel vaccines that induce a protective immune response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant DNA construct comprising a vector, and at least one nucleic acid fragment comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-G. In preferred embodiments of the invention, the vector is a Venezuelan equine encephalitis virus (VEE) replicon vector. Use of this vector results in the production of large amounts of a protein encoded by a sequence cloned into the replicon. The constructs are used to produce vaccines against botulism. The proteins can also be used as diagnostic tools for the diagnosis of botulism. The transformed host cells can be used to analyse the effectiveness of drugs and agents which inhibit toxin effects. The vaccine currently used against botulism is dangerous and expensive to produce, and contains formalin, which is very painful for the recipient. Also, the vaccine is incomplete, in that only 5 of the 7 serotypes are represented in the formulation. The novel vaccine of overcomes these problems, as it is easily purified, and available in large quantities. It is also expressed in the lymph nodes for a better immune response. The present sequence represents the native BoNTA heavy chain N-terminal fragment (Hn) used in an exemplification of the present invention | XX |
| 431 | | Sequence 407 AA; | XX |
| 491 | | AA77141 Length: 407 August 31, 2004 14:39 Type: P Check: 3926 .. | XX |
| 551 | | Found using 'seq23' (hayes346.key) | XX |
| 611 | | 1 MIKVNNDLFFSPSDNFTNDLNGKEITSPTNIEAABENISLDLIQQYYLTFNFDNEPE | 1 |
| 671 | | 61 NISINLSSDIIGQLELMPNTERFPNGKKYELDKYTMHYLRAQBFHCKSKRIALTNSVN | 61 |
| 731 | | 121 EALLNPSRVYTFSSDYKVKYNKATEAAMFLGWVQLVYDFDTESEVSTTDKIADITII | 121 |
| 791 | | 181 IPY | 181 |
| ... | | ... | ... |
| | | 207 GAVILLEFPIEIPAIVLGTGFALVSVYANKVLTVQIDNALSKENKWEDEVYKYIVTNWLA | 207 |
| | | 267 KVTQIDLLIRKKMEALENAEATKAIINYQNOYTBEEKNNINFNIDDLSSKLNESINK | 267 |
| | | 327 AMININKFLNQCSVSYLMSMPIYG | 327 |
| | | ... | ... |
| | | ----- | ----- |
| | | 13 matches found in sequence: | 13 |

aaY77142 ; Native botulinum neurotoxin serotype A (BoNTA) C-terminal fragment
(from "bt ags.pep")
TOIG of: aaY77142 check: 4382 from: 1 to: 432

ID AAY77142 standard; protein; 432 AA.

XX AAY77142;

XX AC (first entry)

XX 08-MAY-2000 (first entry)

DE Native botulinum neurotoxin serotype A (BoNTA) C-terminal fragment (Hc).

XX Botulinum neurotoxin; heavy chain; BoNT; serotype A: C-terminal fragment;

XX Hc; Venezuelan equine encephalitis virus replicon; VEE; botulism;

KW vaccine; diagnosis; drug screening.

XX Clostridium botulinum.

OS Clostridium botulinum.

XX Key Location/Qualifiers

FH Key Location/Qualifiers

FT Misc-difference 432 /note= "Apparently encoded by GGATGGGAG AAAGGCCACT G"

FT Misc-difference 432

FT Misc-difference 432

PN WO200002524-A2.

XX 20-JAN-2000.

XX 09-JUL-1999; 99WO-US015570.

XX 10-JUL-1998; 98US-0092416P.

XX 12-MAY-1999; 99US-0133870P.

XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.

XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;

XX WPI; 2000-160827/14.

XX N-PSDB; AAZ87220.

XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum toxin serotypes A-G, is used for inducing an immune response against botulinum.

XX Example 3; Page 52; 54pp; English.

XX The invention relates to novel vaccines that induce a protective immune response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant DNA construct comprising a vector, and at least one nucleic acid fragment comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-G. In preferred embodiments of the invention, the vector is a Venezuelan equine encephalitis virus (VEE) replicon vector. Use of this vector results in the production of large amounts of a protein encoded by a sequence cloned into the replicon. The constructs are used to produce vaccines against botulism. The proteins can also be used as diagnostic tools for the diagnosis of botulism. The transformed host cells can be used to analyse the effectiveness of drugs and agents which inhibit toxin effects. The vaccine currently used against botulism is dangerous and expensive to produce, and contains formalin, which is very painful for the recipient. Also, the vaccine is incomplete, in that only 5 of the 7 serotypes are represented in the formulation. The novel vaccine of overcomes these problems, as it is easily purified, and available in large quantities. It is also expressed in the lymph nodes for a better immune response. The present sequence represents the native BoNTA heavy chain C-terminal fragment (Hc) used in an exemplification of the present invention

XX Sequence 432 AA;

XX AAY77142 Length: 432 August 31, 2004 14:39 Type: P Check: 4382 ..

XX Found using 'seq23' (hayes346.key)

XX

26 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVNSVNFST

XX 76 79 80 83

XX 86 SFWRIPKYNFNSISLANNEYTIINCMMENSGKVKSLNYGEIITWTLDQTEIKQRVVFKYSQ

XX 104 122 143

XX 146 MINISDVINEWIFVTITNNRLNNSKIYINGRLIDQKPISNLGNHASNIMFKLDGCRDT

XX 206 HRYTIWKYFNLFDKELNEKEIKLDYDNQNSGILKDFWGDYLOVDKPYVMLNLYDPNKYV

XX 208 213 246 253 264

XX 266 DVNNVGIRGYMILKPRGSRVMTTNIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRYIN

XX 267 275 323

XX 326 VVYKNKEYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNKCKNLODNN

XX 386 G

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XX The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. The present sequence represents BoNTA heavy chain C-
CC terminal subfragment AsubHc1, comprising residues 1 to 233 of the BoNTA
CC Hc fragment, and was used in the present invention
XX
SQ Sequence 233 AA;
AAY77143 Length: 233 August 31, 2004 14:39 Type: P Check: 9357 ..
Found using 'seq23' (hayes346.key)
...
26 ESNHLIDLSRYASKINGSKVNFDPIDKNOIQLFNLESSKIEVLKNAIVNSMVNEFST
76 79
86 SFWRIPKYNISLNNEYTYLTINCNNNSGKWSLVNLYCELIWLTQDTQIKQVVFVKYSQ
104 122
146 MINISDYINRWTFVTITNNLNSKIYINGRLIDQKPISNLGNTHASNNIMFKLDGCRDT
146
206 HRYIWKYFNLFDPDKELNEKEIKDLVDNQ
208 213

6 matches found in sequence:
aay77144 ; Botulinum neurotoxin serotype A (BoNTA) C-terminal subfragment Asub
(from "bt_ags.pep")
TOIG of: aay77144 check: 640 from: 1 to: 206
ID AAY77144 standard; protein; 206 AA.
XX
AC AAY77144;
XX
XX 08-MAY-2000 (first entry)
XX Botulinum neurotoxin serotype A (BoNTA) C-terminal subfragment AsubHc2.
DE Botulinum neurotoxin; heavy chain; BoNT; serotype A;
KW C-terminal subfragment; Hc; botulism; VEE;
KW Venezuelan equine encephalitis virus replicon; vaccine; diagnosis;
KW drug screening.
XX Clostridium botulinum.
OS Synthetic.
XX WO200002524-A2.
PN
XX 20-JAN-2000.
PD

XX
PF 09-JUL-1999; 99WO-US015570.
XX
XX 10-JUL-1998; 98US-0092416P.
PR 12-MAY-1999; 99US-0133870P.
XX
XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
PI WPI; 2000-160827/14.
XX N-PSDB; AAZ87222.
DR
DR Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
PT toxin serotypes A-G, is used for inducing an immune response against
PT botulinum.
XX
XX Disclosure; Page 53; 54pp; English.
PS
XX The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. The present sequence represents BoNTA heavy chain C-
CC terminal subfragment AsubHc2, comprising residues 234 to 438 of the BoNTA
CC Hc fragment plus an initia methionine, and was used in the present
CC invention
XX
SQ Sequence 206 AA;
AAY77144 Length: 206 August 31, 2004 14:39 Type: P Check: 640 ..
Found using 'seq23' (hayes346.key)
1 MSNSGILKDFWGDYLDQYDKPYTLMNLYDPNKFVDVNNVVGIRGYMYLKGRSGVMTNIYL
14 17 21 24 32 35 43 46
61 NSSLYRGTKFIKKYASGNKDNIVRNDRVYINVVVKNEKYERLATNAGQAGVEKILSALE
91 94 101
121 IPDVGNLSQVVVMKSKNDQGITNCKMNLQDNNG
...

10 matches found in sequence:
aay78982 ; C. botulinum type D toxin amino acid sequence.
(from "bt_ags.pep")
TOIG of: aay78982 check: 2461 from: 1 to: 399
ID AAY78982 standard; protein; 399 AA.
XX
AC AAY78982;
XX
XX 20-JUN-2000 (first entry)
XX
XX C. botulinum type D toxin amino acid sequence.
DE
XX

CC The sequence represents a the C-terminus of the wildtype botulinum toxin
 CC type A light chain. The invention relates to a novel modified neurotoxin
 CC including a structural modification, where the structural modification is
 CC effective to alter the biological persistence, or biological activity.
 CC The modified neurotoxin is useful for treating spasmodic dysphonia,
 CC laryngeal dystonia, oromandibular dysphonia, lingual dystonia, cervical
 CC spasm, eyelid disorder, cerebral palsy, focal spasticity, spasmodic
 CC colitis, neurogenic bladder, anismus, limb spasticity, tics, tremors,
 CC bruxism, anal fissure, achalasia, dysphagia, lacrimation, hyperhidrosis,
 CC excessive salivation, excessive gastrointestinal secretions, pain from
 CC muscle spasms, headache pain, brow furrows or skin wrinkles
 CC
 SQ Sequence 27 AA;
 ABB80663 Length: 27 August 31, 2004 14:39 Type: P Check: 8911 ..
 Found using 'seq23' (hayes346.key)
 1 NFTKLNFTGLFEFYKLLCVRGITSK
 15 18

 11 matches found in sequence:
 abg69067 ; Botulinum neurotoxin light chain polypeptide #1.
 (from "bt_ags.pep")
 TOIG of: abg69067 check: 9465 from: 1 to: 461
 ID ABG69067 standard; protein; 461 AA.
 XX
 AC ABG69067;
 XX
 DT 07-OCT-2002 (first entry)
 XX
 DE Botulinum neurotoxin light chain polypeptide #1.
 XX
 KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX
 OS Clostridium botulinum.
 XX
 FN WO200236758-A2.
 XX
 PD 10-MAY-2002.
 XX
 PF 06-NOV-2001; 2001WO-US047230.
 XX
 PR 06-NOV-2000; 2000US-0246774P.
 PR 20-JUL-2001; 2001US-00910186.
 PR 09-AUG-2001; 2001US-0311966P.
 XX
 PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX
 PI Smith LA, Jensen M;
 XX
 DR WPI; 2002-575192/61.
 XX
 DR N-PSDB; ABK98537.
 XX
 PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX
 PS Claim 52; Page 118-119; 166pp; English.
 XX
 CC The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70% The BoNT LC protein is

CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX
 SQ Sequence 461 AA;
 ABG69067 Length: 461 August 31, 2004 14:39 Type: P Check: 9465 ..
 Found using 'seq23' (hayes346.key)
 1 MVQFVNKQFNKDPVNGVDIAYIKIPNVGQMPVKAFKIHKINWIPERDTFTNPEEGDL
 22 25
 61 NPPPEAKQVFSYYD
 ...
 136 INVIQDGSYRSEELNLVIIGPSADIIQFECKSGHEVLNLTNRNGYSTQYIRFSPDFTF
 186
 196 GFESLEVDTPNLLGAGKATDPAVTLAHLIAGHRLVGIAPNPNRVKVTNAYEYS
 234
 256 GLEVSFEELRTFGHDAKFDLSLQENEFRLYYNFKFDIATSLNKAKSIVGTASLQYMK
 288
 316 NVFKEKLLSEDTSGKFSVDKLFKLYKMLTEIYTDENFVFKFKVLRNRYLNFDKAVF
 343
 376 KINIVPKVNTIYDGNLNLNTLANFNQNTENNMTKLKNFTGLFEFYKLLCVRGI
 385
 388
 436 ITSKTKSLDKGYNKLVPRSGSHHHHH
 447

 7 matches found in sequence:
 abg69068 ; Botulinum neurotoxin light chain polypeptide #2.
 (from "bt_ags.pep")
 TOIG of: abg69068 check: 9222 from: 1 to: 441
 ID ABG69068 standard; protein; 441 AA.
 XX
 AC ABG69068;
 XX
 DT 07-OCT-2002 (first entry)
 XX
 DE Botulinum neurotoxin light chain polypeptide #2.
 XX
 KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX
 OS Clostridium botulinum.
 XX
 FN WO200236758-A2.

297 330

332 FVVBSSGVTNRNKFVLYNELQIFTEFYAKYINQNRKIVLSNYYTPTANILDDN 330
333 351 363 380
392 VYDIQGNFIPKSNLNLVFMQNLNRNPAKRVNPNMLYLF
...

7 matches found in sequence:
abg69070 ; Botulinum neurotoxin light chain polypeptide #4.
(from "bt ags.pep")
TOIG of: abg69070 check: 764 from: 1 to: 441

ID ABG69070 standard; protein; 441 AA.
XX AC ABG69070;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #4.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.

XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX XX 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98540.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX PS Claim 33; Page 123-124; 166pp; English.

XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70% The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX Sequence 441 AA;

ABG69070 Length: 441 August 31, 2004 14:39 Type: P Check: 764 ..

Found using 'seq23' (hayes346.key)

1 MTFPKDFNYSDDPNDNDILRLIPQNKLIITPVKAFMITQNTWVPERFSSDTNPSLSK 21 24
21 24

61 PPRPTSKYQSYDPSYLSSTDQKDTFLKGIILFKRINERDIDGKKLINLVVGSPPFMGDS 68 71
68 71 109

121 STPEDTDFTRHTTNIATVKEFGSGWKVTNIITPSVLIFGEL

...

246 DKRLRPQVSEGFPSQDGNVQFEELYTFGGDLVETIQLERSQLREKALGHYKDKIAKLNN 296
296

306 INKTIPSSWISNIDKYKKIFSEKYNFKDNTGNFVNIDKFNSLYSLDTNVMSEVYSSQ 321
321 350

366 YNVKNRTHYSRHYLPVPFANILDDNIITIRDGNLTNKGFIENSGQNIERNPALQKLSS 379
379

426 ESVVDLF

...

6 matches found in sequence:
abg69071 ; Botulinum neurotoxin light chain polypeptide #5.
(from "bt ags.pep")
TOIG of: abg69071 check: 3357 from: 1 to: 422

ID ABG69071 standard; protein; 422 AA.
XX AC ABG69071;
XX XX 07-OCT-2002 (first entry)
XX DT Botulinum neurotoxin light chain polypeptide #5.
XX DE Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
XX KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX XX 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98541.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.

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XX PS Claim 33; Page 125-126; 166pp; English.
XX XX
XX XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70% The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tip-toe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX SQ Sequence 422 AA;
ABG69071 Length: 422 August 31, 2004 14:39 Type: P Check: 3357 ..
Found using 'seq23' (hayes346.key)
1 MPKINSFNYPVNDRTILYIKPGCGQFEYKSEINMKMIWIIPERNVIGITPQDFHPPTS
61 LKNGDSSYYDPNLYQSDDEKDRF
...
222 YGAKGITTKYITQKQNPILINIRGTNIEEFLTFGGDLNIITSQAQNDIYNLLADYKK
272 279
282 IASKLSKVQVSNFLNLPYKDYFEAKYGLDKDASGIYSVNNKFNDFIKKLYSFTFEDLAT
299
342 KFQVKCRQTYIGQYKFKLSNLLNDSIYNISEGYNINNLKVNFRGQANLANPRIITPITG
355 357
402 RGLVKKIIR
...
9 matches found in sequence:
abg69072 ; Botulinum neurotoxin light chain polypeptide #6.
(from "bt_ags.pep")
TOIG of: abg69072 check: 7590 from: 1 to: 436
ID ABG69072 standard; protein; 436 AA.
XX AC
XX AC ABG69072;
XX DT
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #6.
XX XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN
XX PN WO200236758-A2.
XX XX
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PD XX 10-MAY-2002.
XX XX
XX XX 06-NOV-2001; 2001WO-US047230.
XX XX
XX XX 06-NOV-2000; 2000US-0246774P.
XX XX
XX XX 20-JUL-2001; 2001US-00910186.
XX XX
XX XX 09-AUG-2001; 2001US-0311966P.
XX XX
XX XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX XX
XX XX Smith LA, Jensen M;
XX XX
XX XX WPI; 2002-575192/61.
XX XX
XX XX N-PSDB; ABK98542.
XX XX
XX XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX XX
XX XX Claim 33; Page 127-128; 166pp; English.
XX XX
XX XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70% The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tip-toe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX XX
XX SQ Sequence 436 AA;
ABG69072 Length: 436 August 31, 2004 14:39 Type: P Check: 7590 ..
Found using 'seq23' (hayes346.key)
1 MPVAINSFNYPVNDRTILYMQIPIYEEKSKKYKAFELMRNVWIIERTIGTNPSEDFDP
21 24 33 36 34 37
61 PASLKNSSAYYDPNLYITDAEKDRYL
...
235 YGARGVYETIEVQKQALPIAIEKPIRLIEEFLTFGGQDLNIITSAMKEKIYNNLLANYEK
285 292
295 IATRLSEVNSAPPEVDINEYKDYFQWKYGLDKNADGSYTVNENKSEIYKKYYSFTESDL
295 314 317 343
355 ANKFVKCRNTYFIKYEFLKVPNLDDDIYTVSEGNIGNLAVNNRQGSIKLNPKLIIDSP
370
415 DKGLVKEIV
...
10 matches found in sequence:
abg69073 ; Botulinum neurotoxin light chain polypeptide #7.
(from "bt_ags.pep")
TOIG of: abg69073 check: 6299 from: 1 to: 439
```

ID XX ABG69073 standard; protein; 439 AA.
AC XX ABG69073;
DT 07-OCT-2002 (first entry)
DE XX Botulinum neurotoxin light chain polypeptide #7.
XX XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX XX WO200236758-A2.
XX XX 10-MAY-2002.
XX XX 06-NOV-2001; 2001WO-US047230.
XX XX 06-NOV-2000; 2000US-0246774P.
XX XX 20-JUL-2001; 2001US-00910186.
XX XX 09-AUG-2001; 2001US-0311966P.
XX XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX XX Smith LA, Jensen M;
XX XX WPI; 2002-575192/61.
XX XX N-PSDB; ABK98543.
XX XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX XX Claim 33; Page 129-130; 166pp; English.
XX XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX XX Sequence 439 AA;
ABG69073 Length: 439 August 31, 2004 14:39 Type: P Check: 6299 ..
Found using 'seq23' (hayes346.key)

237 GLYGIKISNLPTNTKEFFMQHSDPVOAEELYTFGGHDPSPVSPSTDMNINXKALQNFQD
|---|
287
297 TANRLNIVSSAQQSGIDISLYKQIKYKNDYDFVEDPNGKYSVDKDKFKLYKALMEFGFTET
|---| |---| |---|
317 325 346
357 NLAGSYGIKTRYSYSEVSEYLPPIKTEKLLDNTIYTQNEGFNIASKNLKNEFNQGNKAVNKE
|---|
368
417 AYERISLEHLVIVIRIAMCKPVNY
|---| |---|
418 429

7 matches found in sequence:
abg69074 ; Botulinum neurotoxin light chain polypeptide #8.
(firm "bt ags.pap")
TOIG of: abg69074 check: 8975 from: 1 to: 413
ID ABG69074 standard; protein; 413 AA.
XX AC ABG69074;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #8.
XX XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX XX WO200236758-A2.
XX XX 10-MAY-2002.
XX XX 06-NOV-2001; 2001WO-US047230.
XX XX 06-NOV-2000; 2000US-0246774P.
XX XX 20-JUL-2001; 2001US-00910186.
XX XX 09-AUG-2001; 2001US-0311966P.
XX XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX XX Smith LA, Jensen M;
XX XX WPI; 2002-575192/61.
XX XX N-PSDB; ABK98544.
XX XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX XX Disclosure; Page 130-131; 166pp; English.
XX XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff

1 MFVNKFNNDPNNDDIMPEPDPGCTYKAFRIIDRIWIVPRTYGFQDPQFNA
|---|
32 35
33 36
61 STGVFSKDYVEYDPTLYKTDKAEKFLKMTIKLFNINSPSGQLLDWIDVDAIPLGN
|---|
70 73
121 AST
...

CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein

XX
 XX Sequence 413 AA;

ABG69074 Length: 413 August 31, 2004 14:39 Type: P Check: 8975 ..
 Found using 'seq23' (hayes346.key)

...

6 LCIKNNWDLFFPSSEDNFTNDLNGKEBITSDTNIEAAENISLDLIQQYLYLTENFDNEP
 56 59

66 ENISINLSSDIIGLELMPNIEFPNGKYELDKYTMFHYLRAQEFHGKSRIALTNSV
 101 106

126 NEALNPSRVYTFSSDYKVKVKATEAAMFLGWVEQLVYDFTDTSVSTTDKIADITI
 136

186 IIPY

...

213 GAVILLEFPEIAIPVLGTFALVSYANKVLTVQITDNALSKRNEKDEVKYIVTNWLA
 263

273 KVTQIDLRKKMKALENQAEATKAIINYQNYQTEEEKNNINENNIDLLSKINESINK
 304

333 AMININKFNQCSVSLNMSMIPYGVKRLDFDASLKDALLKYIRDNYGTLIGQVDRLLKD
 380

393 KVNNTLSTDIPQLSKYVDNQ

 19 matches found in sequence:
 abg69075 ; Botulinum neurotoxin light chain polypeptide #9a.
 (from "bt.ags.pep")
 TOIG of: abg69075 check: 9369 from: 1 to: 861

ID ABG69075 standard; protein; 861 AA.

XX AC ABG69075;

XX DT 07-OCT-2002 (first entry)

XX DE Botulinum neurotoxin light chain polypeptide #9a.

XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.

XX OS Clostridium botulinum.

XX PN WO200236758-A2.

XX PD 10-MAY-2002.

XX PF 06-NOV-2001; 2001WO-US047230.

XX PR 06-NOV-2000; 2000US-0246774P.

XX PR 20-JUL-2001; 2001US-00910186.

XX PR 09-AUG-2001; 2001US-0311966P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Jensen M;

WPI; 2002-575192/61.

N-PSDB; ABK98545.

Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 serotype A, useful for producing the neurotoxin for vaccination against
 botulism, comprises sequence expressible in host other than Clostridium.

Claim 13; Page 133-134; 166pp; English.

The invention relates to a nucleic acid molecule encoding a botulinum
 neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 that is expressible in a host organism other than Clostridium, or has a
 total A+T content that is less than about 70%. The BoNT LC protein is
 useful in vaccination against botulism, for eliciting protective immunity
 in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 conditions characterised by hyperactivity of the lower motor neuron, and
 to control autonomic nerve function or tiptoe-walking due to stiff
 muscles common in children with cerebral palsy. The sequences are also
 useful for screening for botulinum neurotoxin inhibitors. This sequence
 represents a botulinum neurotoxin light chain serotype A protein

SQ Sequence 861 AA;

ABG69075 Length: 861 August 31, 2004 14:39 Type: P Check: 9369 ..
 Found using 'seq23' (hayes346.key)

1 MVQFVNKQFNKDPVNGVDIAIKIPNVGMQPVKAFKIHNKIWIPIERDTFTNPEGDL
 22 25

61 NPPPEAKQVPVSYYD

...

136 INVIQDGSYRSEELNLVIIGPSADIIQPECKSFGEVLNLTFRNGYGSTQYTRFSPDFTF
 186

196 GFESLEVDTNPLLGAGKEATDPAVTLAHELHAGHRLYGIALNPVRVKNTNAYEMS
 234 251

256 GLEVSFEELRTFGHDAKFIDSLQENEPRLYYVYKFKDIASITLNKAKSIVGTASLQYMK
 286 288

316 NVFKEKLLSEDTSGKFSVDKLFKFKLTKMLTEIYTEDNFVKFKVLNRTYLNFDKAVF
 343 367

376 KINIVPKVNTYTYDGFNLNNTNLAAFNQNTENNNTNFTKLNKFTGLFEFFYKLLCVRG
 385 388 427

436 ITSKTKSLDKGNKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEITSDTNEAAENI
 447

496 SLDLIQOYLYLTFFNEDNEPENISINLSSDIIGQLMLPNTERFPNGKKYELDKYTMFHYL
 504 549 554

556 RAQEFHGKRIALTNSVNEALINPVRVTFSSDYVKKVNKATEAAMFLGWVQLVYDF
557
616 TDETSEVSTTDKIADITIIIPY
...
661 GAVILLEFIPIAIPVLGTFALVSYIANKVLTVQIDNALSKRNEKWEVYKIIVTNMLA
711
721 KVTQTIDLIRKMKREALENOAEATKALINQVNOYTEEBEKNINFINIDLLSKLINESINK
752
781 AMININKELNQCYSYLMNSMIPYGVKRLDFDASLKDALLKYIRDNYGTGLIGQVDRLEKD
828
841 KVNNTLSTDIPFQLSKYVDNQ

7 matches found in sequence:
abg69076 ; Botulinum neurotoxin light chain polypeptide #10.
(from "bt_ags.pep")
TOIG of: abg69076 check: 9222 from: 1 to: 441
ID ABG69076 standard; protein; 441 AA.
XX
AC ABG69076;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #10.
XX
DE Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
OS Clostridium botulinum.
XX
PN WO200236758-A2.
XX
PD 10-MAY-2002.
XX
PF 06-NOV-2001; 2001WO-US047230.
XX
PR 06-NOV-2000; 2000US-0246774P.
XX
PR 20-JUL-2001; 2001US-00910186.
XX
PR 09-AUG-2001; 2001US-0311966P.
XX
PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Jensen M;
XX
DR WPI; 2002-575192/61.
XX
DR N-PSDB; ABK98546.
XX
PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
PS Claim 33; Page 135-136; 166pp; English.
XX
CC The invention relates to a nucleic acid molecule encoding a botulinum
neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70% The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity

CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX Sequence 441 AA;
SQ
ABG69076 Length: 441 August 31, 2004 14:39 Type: P Check: 9222 ..
Found using 'seq23' (hayes346.key)
1 MPVTINNFYNDPIDNNNIIMMEPPFARGTGRYKAFKITDRIMIPERYTFGYKPEDFN
33 36
34 37
61 KSGIFNRDVCYYDEYDYLNTDKNI
...
149 ERKKGIFANLIIFGPGVNLNENETIDIGIQNHPASREGFGGIMQKPCPEYVSFNNVQE
199
209 NKGASIFNRGYSFSDPALIIMHDLIHVLHGLYGIKVDLPIVNEKKFFMQSTDAIQAE
289
269 LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVRLNKLVLVCISDPNININIKKFKDKY
328
329 KFVEDSEKYSIDVESFDKLYSLMFGFTETNAENYKIKTRASYFSDSLPPVKIKLLD
331
349
389 NEIYTIIEGFNISDKDMEKRYRGONKAINKQAYEEISKEHLAVYKIOMCKSVK
421

12 matches found in sequence:
abg69077 ; Botulinum neurotoxin light chain polypeptide #11.
(from "bt_ags.pep")
TOIG of: abg69077 check: 9628 from: 1 to: 852
ID ABG69077 standard; protein; 852 AA.
XX
AC ABG69077;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #11.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
OS Clostridium botulinum.
XX
PN WO200236758-A2.
XX
PD 10-MAY-2002.
XX
PF 06-NOV-2001; 2001WO-US047230.
XX
PR 06-NOV-2000; 2000US-0246774P.
XX
PR 20-JUL-2001; 2001US-00910186.

Thu Sep 2 08:56:11 2004

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PR 09-AUG-2001; 2001US-0311966P.
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX Smith LA, Jensen M;
XX WPI; 2002-575192/61.
XX N-PSDB; ABK98547.
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 52; Page 138-139; 166pp; English.
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 852 AA;
SQ
ABG69077 Length: 852 August 31, 2004 14:39 Type: P Check: 9628
Found using 'seq23' (hayes346.key)
1 PVTINNFNVDIDNNIMPEPPFARGTGRVYKAFKITDRIWIIPERYTFGYKPEDFNK
32 35
33 36
61 SSGIFNRDVEYYDPDLMTNDKNI
...
148 ERKKGIFANLIIFPGPVLNENETIDIGIQNHPSREGFGGIMQMKFCPEYVSVFNNVOE
198
208 NKGASIFNRGYSDFALILMHLELIHVLHGLYKIVDDLPVIVNEKKFFMQSTDAIQAE
268 LXTFGQDPSIITPSTDKSYIDKVLQNFGRGIVDRLNKVLVCISDPNININIKYKFKDKY
327
328 KFVEDSEGKSIDVESFDKLYKSLMFGFTETNAENYKIKTRASYFSDSLPPVKIKNLLD
330
388 NEITYIEEGFNISDKMEYRGQNKAINQAYEEISKEHLAVYKIOMCKSVKAPGICID
420
448 VDNEDLFFIADKNSFSDLSKNERIE
...
519 VYEKQPAIKKIFTDENTIFQLYSQTFPLDIRDISLTSFDDALLFSNKVYSFPMYDIK
569
579 TANKVVEAGLFAGWVKQIVNDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF
622
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639 ENAFETAGASILLEFIPVVGAFLESYIDNKNKIITDINALTKRNEKWSMDYGL
696
699 IVAQWLSTVNTQFYTIKEGMYKALNYQAQALEELIKYRYNIYSEKESKNINIDENDINSK
737
759 LNEGINQAIDNINNINNGSVSYLMKKMPLA
...
-----
9 matches found in sequence:
abg69078 ; Botulinum neurotoxin light chain polypeptide #12.
(from "bt_ags.pep")
TOIG of: abg69078 check: 5695 from: 1 to: 436
ID ABG69078 standard; protein; 436 AA.
XX AC ABG69078;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #12.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
XX KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
XX KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
XX KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
XX KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
XX KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98548.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 33; Page 140-141; 166pp; English.
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, cosmetic treatment of facial wrinkles,
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX
```

SQ Sequence 436 AA;
 ABG69078 Length: 436 August 31, 2004 14:39 Type: P Check: 5695 ..
 Found using 'seq23' (hayes346.key)
 ...
 151 INPSVIITGPENIIDPETSFTKLTNNTFAAQEGFGALSIIISPRFMLTYSNATNDVGE 201
 211 GRFSKSEFCMDPILILMHELNHAMHNLGYIAIPNDQTISSVTSNIFYSQYNVKLEYAEIY 257
 271 AFGGPTIDLPKSARKYFEKALDYRSIAKRLNSITTANPSSFNKYIGYKQKLIRKYR 329
 331 FVWSSGSEVTNRNKFVLYNELTQITFEFNKAKIYNQNRKIYLSNVYTPVTANILDDN 379
 391 VYDIQNGFNIPKSNLNVLFMGQNLRSNPALRKVPENMLYLF 362
 ...

 17 matches found in sequence:
 abg69079 ; Botulinum neurotoxin light chain polypeptide #13.
 (from "bt_ags.pep")
 TOIG of: abg69079 check: 3927 from: 1 to: 811
 ID ABG69079 standard; protein; 811 AA.
 AC ABG69079;
 XX
 DT 07-OCT-2002 (first entry)
 XX Botulinum neurotoxin light chain polypeptide #13.
 DE
 XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX Clostridium botulinum.
 OS
 XX WO200236758-A2.
 PN
 XX 10-MAY-2002.
 PD
 XX 06-NOV-2001; 2001WO-US047230.
 PP
 XX 06-NOV-2000; 2000US-0246774P.
 PR 20-JUL-2001; 2001US-00910186.
 PR 09-AUG-2001; 2001US-0311966P.
 XX
 XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 PA
 XX Smith LA, Jensen M;
 FI WPI: 2002-575192/61.
 XX N-PSDB; ABK98549.
 DR
 XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX
 PS Claim 52; Page 142-144; 166pp; English.
 XX

CC The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70% the BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX
 SQ Sequence 811 AA;
 ABG69079 Length: 811 August 31, 2004 14:39 Type: P Check: 3927 ..
 Found using 'seq23' (hayes346.key)
 ...
 151 INPSVIITGPENIIDPETSFTKLTNNTFAAQEGFGALSIIISPRFMLTYSNATNDVGE 201
 211 GRFSKSEFCMDPILILMHELNHAMHNLGYIAIPNDQTISSVTSNIFYSQYNVKLEYAEIY 257
 271 AFGGPTIDLPKSARKYFEKALDYRSIAKRLNSITTANPSSFNKYIGYKQKLIRKYR 329
 331 FVWSSGSEVTNRNKFVLYNELTQITFEFNKAKIYNQNRKIYLSNVYTPVTANILDDN 379
 391 VYDIQNGFNIPKSNLNVLFMGQNLRSNPALRKVPENMLYLF 362
 ...
 458 IGLDSVDKTDIFLRKDINEETVIYYPDNVSDQVILSKNTSEHGQDLIYPSIDSESEI 508
 518 LPGAQVYDNRQTQVNDYLSYYLSQKLSDNVEDFTFTRSTEEALDLSAKVYTPFTL 571
 578 ANKNAGVQGLFLMWANDVVEDFTTNILRKDTLKDTSVSAIPIYIGPALNLSNVRRG 669
 638 NFTEAFAVTGVTILLEAFPEFTIPALGAFVIYSKVQVERNEIITDNCLEQRIKRWKDSY 697
 698 EWMGTWLSRIITQFNNSISYQMYDSLNYQAGAKAKIDLEYKYSKSDKENIKSQVENLK 738
 708 NSLDVKISEAMNNINKFIRECSVTFLFKNMLPKV 720
 ...

 7 matches found in sequence:
 abg69080 ; Botulinum neurotoxin light chain polypeptide #14.
 (from "bt_ags.pep")
 TOIG of: abg69080 check: 7279 from: 1 to: 440
 ID ABG69080 standard; protein; 440 AA.
 XX

305 INKTIPTSSWISNIDKFKIFSEKYNFDKNTGNEFVNIDKFNLSYSDLTNVMSEVTVSSQ
320
365 YNKNRTHYFSRHLVPANILDDNIYTIIRDGFNLTKNGFIENSGQNIERNPALQKLSS
378
425 ESVVDLF
...
16 matches found in sequence:
abg69081 ; Botulinum neurotoxin light chain polypeptide #15.
(from "bt_ags pep")
TOIG of: abg69081 check: 6240 from: 1 to: 824
ID ABG69081 standard; protein; 824 AA.
XX AC ABG69081;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #15.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98551.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
serotype A, useful for producing the neurotoxin for vaccination against
botulism, comprises sequence expressible in host other than Clostridium.
XX PS Claim 52; Page 147-149; 166pp; English.
XX CC The invention relates to a nucleic acid molecule encoding a botulinum
neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
that is expressible in a host organism other than Clostridium, or has a
total A+T content that is less than about 70% The BoNT LC protein is
useful in vaccination against botulism, for eliciting protective immunity
in a mammal, for treating dystonias, spasticity, pain, ocular motility,
facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
conditions characterised by hyperactivity of the lower motor neuron, and
to control autonomic nerve function or tiptoe-walking due to stiff
muscles common in children with cerebral palsy. The sequences are also
useful for screening for botulinum neurotoxin inhibitors. This sequence
represents a botulinum neurotoxin light chain serotype A protein
Sequence 824 AA;

AC ABG69080;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #14.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98550.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
serotype A, useful for producing the neurotoxin for vaccination against
botulism, comprises sequence expressible in host other than Clostridium.
XX PS Claim 33; Page 145-146; 166pp; English.
XX CC The invention relates to a nucleic acid molecule encoding a botulinum
neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
that is expressible in a host organism other than Clostridium, or has a
total A+T content that is less than about 70% The BoNT LC protein is
useful in vaccination against botulism, for eliciting protective immunity
in a mammal, for treating dystonias, spasticity, pain, ocular motility,
facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
conditions characterised by hyperactivity of the lower motor neuron, and
to control autonomic nerve function or tiptoe-walking due to stiff
muscles common in children with cerebral palsy. The sequences are also
useful for screening for botulinum neurotoxin inhibitors. This sequence
represents a botulinum neurotoxin light chain serotype A protein
Sequence 440 AA;
ABG69080 Length: 440 August 31, 2004 14:39 Type: P Check: 7279 ..
Found using 'seq23' (hayes346.key)
1 TWPVKDFNYSDPVNDILYRIPQNKLTTPVKAFMITQNTWVPRFSDNPNLSKP
20 23
61 PRPTSKYQSYDPSYLSDEQKOTFLKGIKLFKRINERDGLKLNLYVSGPFMGDSS
67 70
121 TPEDTFDTRHTTNAVKEPFENGSKVNTIITPSVLIFGL
295
245 DKRIRPQVSEGFSDQGNVQFEBLYTFGGDLVETIIQIERSQLREKALGHYKDIKRLNN
295

ABG69081 Length: 824 August 31, 2004 14:39 Type: P Check: 6240
Found using 'seq23' (hayes346.key)

```
1  TWVKDFNYPVNDNDILYLRIPQNKLIITPVKAFMITQNTWIPERFSSTNPISLSP
   20 23
61  PRPTSKYSYDPSVLSLTDQKDTFLKGLIKLFRINERDICKLINYLIVGSPFMGDSS
   67 70
121  TPEDTFDTRHTTIAVEKPFENGSKVNTNIITPSVLIFGL
   ...
245  DKRIRPQVSEGFSSQDGNVQVEELYTFGLDVEITQIERSQLREKALGHVKDIKRLNN
   295
305  INKTISSWISNIDKKIKFSEKYNFDKNTGNFVNIDKFNLSYSDLTNTVMSEVVYSSQ
   320
365  YNVKNRTHYFSRHYLPVFANILDDNIYITRDGFNLTKNGFNIENSGQNIERNPALQLSS
   378
425  ESVVDLF
   ...
478  ETNVQVNSDKFSLDESILDGQVPIINPVLPLFNVMNEPLNPGEEIVFYDDITKYVDY
   528 534
538  LNSYVILESKLSNNVENITLTSVEALGVSNKIYTFPLSLAEKVNKGVQAGLFLNWN
   541
598  EVVEDFTNMKKDITDKISDVSVIPIYIGPALNIGNSALRGNFNOAFATAGVALLLEGF
658  PEFTIPALGVFTFYSSIQEREKIITKTIENCLEQRVKRWKDSYQMMVSNLRLITQFNHI
   671
718  NYQVDSLSYQADAIKAKIDLEYKYSGSDKENIKSQVENLKNLSLDVKISEAMNINKFI
   719
778  REGSVTYLFAKNMLPKV
   ...
```

6 matches found in sequence:

abg69082; Botulinum neurotoxin light chain polypeptide #16.
(from "Bt_Ags.pep")
TOIG of: abg69082 check: 4295 from: 1 to: 427

```
ID  ABG69082 standard; protein; 427 AA.
XX  AC
XX  ABG69082;
XX  DT 07-OCT-2002 (first entry)
XX  Botulinum neurotoxin light chain polypeptide #16.
XX  Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
```

cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
lower motor neuron hyperactivity; autonomic nerve function; muscular;
immunostimulant; antibacterial.

Clostridium botulinum.
WO200236758-A2.
10-MAY-2002.
06-NOV-2001; 2001WO-US047230.
06-NOV-2000; 2000US-0246774P.
20-JUL-2001; 2001US-00910186.
09-AUG-2001; 2001US-0311966P.
(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Jensen M;
WPI; 2002-575192/61.
N-PSDB; ABK98552.

Novel nucleic acid molecule encoding botulinum neurotoxin light chain serotype A, useful for producing the neurotoxin for vaccination against botulism, comprises sequence expressible in host other than Clostridium.
Claim 33; Page 150-151; 166pp; English.

The invention relates to a nucleic acid molecule encoding a botulinum neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence that is expressible in a host organism other than Clostridium, or has a total A+T content that is less than about 70%. The BoNT LC protein is useful in vaccination against botulism, for eliciting protective immunity in a mammal, for treating dystonias, spasticity, pain, ocular motility, facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles, conditions characterised by hyperactivity of the lower motor neuron, and to control autonomic nerve function or tiptoe-walking due to stiff muscles common in children with cerebral palsy. The sequences are also useful for screening for botulinum neurotoxin inhibitors. This sequence represents a botulinum neurotoxin light chain serotype A protein

Sequence 427 AA;

ABG69082 Length: 427 August 31, 2004 14:39 Type: P Check: 4295
Found using 'seq23' (hayes346.key)

```
1  MPKINSFNYPVNDRTILYIKPGQCFYKSFNIMKNIWIIPERNVIGTTPQDFHPPTS
   30 33
61  LKNGDSSYYDPNVLQSDDEKDRF
   ...
222  YGAKGITTKYTITQKONPLITNIRGTNIEEFLTFGTDNLNITSQNSNDIYTNLLADYKK
   272 279
282  IASKLSKVQVSNPLINPYKDVFEAKYGLDKDASGYVSNINKFNDFKKLYSFTEFDLAT
   282
342  KFOVKCRQTYIGQYKLYFKLSNLLNDSIYNISEGYNNLNKVNFRGQANLNPRITPTIG
   355
402  RGLVKKIIR
   ...
```

12 matches found in sequence:
abg69083 ; Botulinum neurotoxin light chain polypeptide #17.
(from "bt_ags.pep")
TOIG of: abg69083 check: 4621 from: 1 to: 804

ID ABG69083 standard; protein; 804 AA.
XX
AC ABG69083;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #17.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
OS Clostridium botulinum.
XX
XX WO200236758-A2.
XX
XX 10-MAY-2002.
XX
XX 06-NOV-2001; 2001WO-US047230.
XX
XX 06-NOV-2000; 2000US-0246774P.
XX
XX 20-JUL-2001; 2001US-00910186.
XX
XX 09-AUG-2001; 2001US-0311966P.
XX
XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Jensen M;
XX
XX WPI; 2002-575192/61.
XX
XX N-PSDB; ABK98553.
XX
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
XX serotype A, useful for producing the neurotoxin for vaccination against
XX botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 52; Page 152-154; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
XX neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
XX that is expressible in a host organism other than Clostridium, or has a
XX total A+T content that is less than about 70% The BoNT LC protein is
XX useful in vaccination against botulism, for eliciting protective immunity
XX in a mammal, for treating dystonias, spasticity, pain, ocular motility,
XX facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
XX myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
XX conditions characterised by hyperactivity of the lower motor neuron, and
XX to control autonomic nerve function or tiptoe-walking due to stiff
XX muscles common in children with cerebral palsy. The sequences are also
XX useful for screening for botulinum neurotoxin inhibitors. This sequence
XX represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 804 AA;
SQ

ABG69083 Length: 804 August 31, 2004 14:39 Type: P Check: 4621 ..
Found using 'seq23' (hayes346.key)

1 MPKINSFNYPNDPNDRIILYKPGCCQCFYKSFNMKNMILPERNVIGTTPQDFHPPTS
30 33
61 LKNGDSSYYDPNLYLQSDDEKDRF
...

222 YGAKGITTKVTITOKQNPLITNIRGTNIEBFLTFGGTDLNITSAQSNDIYTNLLADYKK
272 279
282 IASKLSKVQVSNPLLPYKDVFEAKYGLDKDASGIYSVINKNFNDFEKLKYSFTFEDLAT
282 299
342 KFQVKCRQTYIGQYKFKLSNLDNSIYNISEGYNINNKLKUNFRGQANLNPRITITPTG
355 357
402 RGLVKKIIR
...
472 ILNFSSEAPGLSDEKMLTITQNDAYIPKYDSNGTSDIEQHDVHNLNFFVYLDAAQKVPBG
522 522
532 ENNVNLTSSIDTALLEQPKIYTFSSSEFINNVNKPQVQAALFVSMIQQVLDVDTTEANQKS
552 552
592 TVDKIADISIVVPYIGLALNIGNEAQNKGFKDALELLGAGILLEFEPELLIPTILVFTIK
605 605
652 SFLGSSDNKNKVIKAINNALKERDEKWEKVSFIVSNMWTKINTOFNKKRKBOMYQALQNO
682 705
712 VNAIKTIIESKNSYTLBEKNELTNKYDIKQIENELNQKVSIAMNNIDRFLETSSISYLM
723 723
772 KLINE
...

9 matches found in sequence:
abg69084 ; Botulinum neurotoxin light chain polypeptide #18.
(from "bt_ags.pep")
TOIG of: abg69084 check: 1754 from: 1 to: 443

ID ABG69084 standard; protein; 443 AA.
XX
XX AC ABG69084;
XX
XX DT 07-OCT-2002 (first entry)
XX
XX DE Botulinum neurotoxin light chain polypeptide #18.
XX
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
XX OS Clostridium botulinum.
XX
XX PN WO200236758-A2.
XX
XX PD 10-MAY-2002.
XX
XX 06-NOV-2001; 2001WO-US047230.
XX
XX 06-NOV-2000; 2000US-0246774P.
XX

PR 20-JUL-2001; 2001US-00910186.
 PR 09-AUG-2001; 2001US-03111966P.
 XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX Smith LA, Jensen M;
 PA WPI; 2002-575192/61.
 XX N-PSDB; ABK98554.
 XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX Claim 33; Page 155-156; 166pp; English.
 XX The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70% The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX Sequence 443 AA;

ABG69084 Length: 443 August 31, 2004 14:39 Type: P Check: 1754 ..
 Found using 'seq23' (hayes346.key)

1 MPVVSFNVDNPDVNDTILYMQIPYEKSKYKAFEMRNWIIIPERNITIGTDPDSDFD
 21 24 33 36 34 37

61 PPASLENGSSAYDPNLTDAEKDRY

...

237 YGARGVYKETIKVKQAPLMAEKPIRLEEFITGGQDILNITSAMKEKIYNLLANYEK
 287 294

297 IATRLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGSGYTVNENKFNKLYSFTFIDL
 297 316 319

357 ANKFVKCRNTYFIKYGFLKVPNLLDDIYTVSEGFNIGNLVNRRGNKLNPKIIDSI
 372

417 PDKGLVEKI

...

15 matches found in sequence:
 abg69085; Botulinum neurotoxin light chain polypeptide #19.
 (from "bt_ags.pep")
 TOIG of: abg69085 check: 3301 from: 1 to: 858

ID ABG69085 standard; protein; 858 AA.

XX ABG69085;

AC

XX

DT 07-OCT-2002 (first entry)
 XX Botulinum neurotoxin light chain polypeptide #19.
 XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX Clostridium botulinum.
 OS WO200236758-A2.
 XX 10-MAY-2002.
 XX 06-NOV-2001; 2001WO-US047230.
 PF 06-NOV-2001; 2000US-0246774P.
 PR 20-JUL-2001; 2001US-00910186.
 PR 09-AUG-2001; 2001US-03111966P.
 XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX Smith LA, Jensen M;
 PI WPI; 2002-575192/61.
 DR N-PSDB; ABK98555.
 XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX Claim 52; Page 157-159; 166pp; English.

The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70% The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX Sequence 858 AA;

ABG69085 Length: 858 August 31, 2004 14:39 Type: P Check: 3301 ..
 Found using 'seq23' (hayes346.key)

1 MPVVSFNVDNPDVNDTILYMQIPYEKSKYKAFEMRNWIIIPERNITIGTDPDSDFD
 21 24 33 36 34 37

61 PPASLENGSSAYDPNLTDAEKDRY

...

237 YGARGVYKETIKVKQAPLMAEKPIRLEEFITGGQDILNITSAMKEKIYNLLANYEK
 287 294

297 IATRLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGSGYTVNENKFNKLYSFTFIDL
 297 316

XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX Claim 33; Page 160-161; 166pp; English.
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tip-toe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX Sequence 444 AA;
SQ
ABG69086 Length: 444 August 31, 2004 14:39 Type: P Check: 3610 ..
Found using 'seq23' (hayes346.key)
1 MPVNKFNFNNDPINDDIIMWEPNDPGPGTYKAFRIIDRIWIVPERFTYGFQPDQFN
61 ASTGVFSKDVVEYDPTYLKTDKDAEKDKLTKMILFNLRINSKPSGQRLDMIVDAIPYL
121 NAST
...
239 LYGIKISNLPITPNTKEFFFMQHSDFVQAEELYTFGGHDPSPVSPSTDMNLYKALQNFQD
299 IANRLNIVSSAAGSGIDISLYKQIVKNKYDFVEDPDKNGKYSVDKDKLYKALMFGFTET
359 NLAGYGIKTRYSYFSEYLLPPIKTEKLLDNTIYTQNEGFNIASKNLKEPFGQNKAVNKE
419 AYBEISLEHLVYRIAMCKPVMYXXD

15 matches found in sequence:
abg69087; Botulinum neurotoxin light chain polypeptide #21.
(from "bt_ags.pep")
TOIG of: abg69087 check: 3952 from: 1 to: 848
ID ABG69087 standard; protein; 848 AA.
XX AC ABG69087;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #21.
XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;

357 ANKFYKCRNTYFKYGLFVLPNLLDDDIYTVSEGFNIGNAVNRGQNIKLPKIIDS
417 PDKGLVEKI
...
493 NNVERNLDVILNYSQTIPQISNRTNLTLVQDNSVYPRYDNGTSELEEVDVVDENVFF
553 YLHAQYPEGETNLSLTSSIDTALLEESKDIFFSSEFIDTINKFPVNAALFIDWISKVIRD
613 FTTBATQKSTVDKIADISLIVPYVGLALNIIIEAKGNFEAFELLGVGILLEFPVELTI
673 PVILVFTIKSYDSYENKAKKAINNSLIEREAKWKEIYGVSNWLNTRINTQFNKKE
733 QMYQALQNVDAIKTAIEYKKNYTSDEKNRLESYNNINIEELNKKVSLAMKNIERFM
793 TESSISYLMKLINE
...
10 matches found in sequence:
abg69086; Botulinum neurotoxin light chain polypeptide #20.
(from "bt_ags.pep")
TOIG of: abg69086 check: 3610 from: 1 to: 444
ID ABG69086 standard; protein; 444 AA.
XX AC ABG69086;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #20.
XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX Clostridium botulinum.
XX OS WO200236758-A2.
XX PN 10-MAY-2002.
XX PD 06-NOV-2001; 2001WO-US047230.
XX PF 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX Smith LA, Jensen M;
XX WPI; 2002-575192/61.
XX N-PSDB; ABK98556.
DR

KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.

OS Clostridium botulinum.

FN WO200236758-A2.

XX 10-MAY-2002.

XX 06-NOV-2001; 2001WO-US047230.

XX 06-NOV-2000; 2000US-0246774P.

PR 20-JUL-2001; 2001US-00910186.

PR 09-AUG-2001; 2001US-0311966P.

XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

PI Smith LA, Jensen M;

XX WPI; 2002-575192/61.

DR N-PSDB; ABK98557.

XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.

XX Claim 52; Page 162-164; 166pp; English.

PS The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70%. The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein

SQ Sequence 848 AA;

ABG69087 Length: 848 August 31, 2004 14:39 Type: P Check: 3952 ..
 Found using 'seq23' (hayes346.key)

1 MFVNKNFNYNDPINDDIIMPEFNDPGTGYKAFRIIDRIWIYPERFTYGFQPDQFN
 33 36
 34 37

61 ASTGVFSKDVYEDFTYLTAKDAEKFLKTMKLFNRINSKPSGQRLDMIVDAIPYLG
 71 74

121 NAST

...

239 LYGIKISNLPITPNTKEPFMOHSDPVQAEELYTFGHDPSVISPSPTDMNIYNKALQNFOF
 289

299 IANRLNIVSSAOGSGIDISLYKQIYKNKYDFVEDPNGKYSVDKDFKLYKXLMFGFTET
 319 327
 348

359 NLAGFYGIKTRYSEYSELYLPPIKTEKLLDNTIYTQNEGFNTASKNKLKTEFNGQNKAVNKE
 370

419 AYEEISLEHLVIRIAMCKPVMYKNTGKSEQCIIVNEDLPIANKDSFSKDLAKAETIA
 420 431

479 YNTQNN

...

495 LILDNDLSSGIDLPENTPEFTNFDDIDIPVIYKQSAALKKIFVDGDSLFYIHAQTFFSN
 545

555 IENQUTNSLNDALRNNKVTFFSTNLVEKANTVVGASLFVNVKGVYDDFTSSTQKST
 574

615 IDKVSVDVSIIPY

...

651 GAAILMEFIFELIPIVIGFTILRSYGNKGHIIMTISNALKKRDKQWTDYGLIVSQWLS
 701

711 TVNTQFYTIKERYMNALNNQSALEKIIEDQYNYRSEEDKMNINIDFNDIFKLNQSNIL
 742

771 AINNIDFINQCSISYLMNRMIPLA

...

10 matches found in sequence:
 abg69089; Botulinum neurotoxin light chain polypeptide #9b.
 (from "bc_ags.pep")
 TOIG of: abg69089 check: 8712 from: 1 to: 449

ID ABG69089 standard; protein; 449 AA.

AC ABG69089;

DT 07-OCT-2002 (first entry)

DE Botulinum neurotoxin light chain polypeptide #9b.

XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.

XX Clostridium botulinum.

XX WO200236758-A2.

XX 10-MAY-2002.

XX 06-NOV-2001; 2001WO-US047230.

XX 06-NOV-2000; 2000US-0246774P.

PR 20-JUL-2001; 2001US-00910186.

PR 09-AUG-2001; 2001US-0311966P.

XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

XX Smith LA, Jensen M;

XX WPI; 2002-575192/61.

DR N-PSDB; ABK98545.

XX

PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX
XX Claim 13; Page 165-166; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT/LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70% The BoNT/LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, cosmetic treatment of facial wrinkles,
CC myoclonus, hyperkinetic disorders, bladder dysfunction, segmental
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tip-toe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 449 AA;
SQ
ABG69089 Length: 449 August 31, 2004 14:39 Type: P Check: 8712 ..
Found using 'seq23' (hayes346.key)
1 MVQFVNKQFNKDPVNGVDIAYIKIPNVGOMQPVKAFKHNKIWIPIRDTFTNPEEGDL
22 25
61 NPPPEAKQVPVSYD
...
136 INVLPDGSYRSEELNVIIGPSADIQPECKSFGEVLNLRNGYGSQYIRFSPDFTF
186
196 GFESLEVDTNELLGAGKFPATDPAVTLAHLIAGHRLYGIAINENRNVKNTNAYEYS
234
256 GLEVSFEELRTGGHDAKFDLSLOENEFRLYNKFKDIASITLNKAKSIVGTTSIQYMK
288
316 NVFKEKYLSEDTSKGFSDVCLKFDKLYKMLTEIYTDENFVKFFKVLNKRKTLNFDKAVF
343
376 KINIVPKVNTIYDGFNLRNLTNLAANFNGQTEINNNMFTKLNKFTGLFEFYKLLCVRG
385 388
436 ITSKTSKSLDKGYNK

2 matches found in sequence:
abu56836 ; BoNT/A Hc binding antibody scTv VH region from 1A1 #1.
(from "bt_ags.pep")
TOIG of: abu56836 check: 2293 from: 1 to: 66
ID ABU56836 standard; protein; 66 AA.
XX
AC ABU56836;
XX
XX 04-APR-2003 (first entry)
XX BoNT/A Hc binding antibody scTv VH region from 1A1 #1.
XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW

immunoglobulin.
Mus sp.
US2002155114-A1.
24-OCT-2002.
31-AUG-1998; 98US-00144886.
31-AUG-1998; 98US-00144886.
(MARK/) MARKS J D.
(AMER/) AMERSDORFER P.
Marks JD, Amersdorfer P;
WPI; 2003-182618/18.
Novel antibody that specifically binds and neutralizes botulinum
neurotoxin type A useful for neutralizing botulinum neurotoxin and
treating botulism.
Claim 6; Page 22; 31pp; English.
The invention relates to an isolated antibody that specifically binds to
an epitope specifically bound by an antibody expressed by a clone such as
clone S25, C25, C39, IC6 and clone IP3, where the antibody binds to and
neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
polypeptide comprising BoNT/A neutralising epitope comprising an epitope
which is specifically bound by the antibody, where the polypeptide is not
a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
antibody that neutralises BoNT/A (by contacting several antibodies with
an epitope specifically bound by an antibody expressed by any of the
novel clones and isolating an antibody that specifically binds to the
epitope). The antibody is useful for neutralising a BoNT/A, by contacting
botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
chain variable region complementarity determining region) and with a
second anti-BoNT/A antibody which comprises a VH CDR, where the second
antibody binds to a different epitope than the first anti-BoNT/A
antibody. The antibody is useful in the treatment of pathologies
associated with botulinum neurotoxin poisoning, for rapid
detection/diagnosis of botulism and in the detection and/or
quantification of BoNT/A in a biological sample obtained from an organism.
which is indicative of a Clostridium botulinum infection of the organism.
The present sequence is a heavy chain variable region (VH) of a single
chain antibody (scFv) of the invention
SQ Sequence 66 AA;
ABU56836 Length: 66 August 31, 2004 14:39 Type: P Check: 2293 ..
Found using 'seq23' (hayes346.key)
1 EVKLVEGGGLVQGGSRKLSKATSGTFTSDYMSWIROSPDKRLLEWATISDGGTYTYV
33 36
61 PDSVKG

1 match found in sequence:
abu56841 ; BoNT/A Hc binding antibody scTv VL region from 1B3 #1.
(from "bt_ags.pep")
TOIG of: abu56841 check: 113 from: 1 to: 57
ID ABU56841 standard; protein; 57 AA.
XX
AC ABU56841;
XX
XX 04-APR-2003 (first entry)
XX BoNT/A Hc binding antibody scTv VL region from 1B3 #1.
XX
DE

Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region; scFv; antibody; botulism; antibacterial; single chain antibody; VL; immunoglobulin.

Mus sp.

US2002155114-A1.

24-OCT-2002.

31-AUG-1998; 98US-00144886.

31-AUG-1998; 98US-00144886.

(MARK/) MARKS J D.

(AMER/) AMERSDORFER P.

Marks JD, Amersdorfer P;

WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 9; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H_c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 57 AA;

ABU56841 Length: 57 August 31, 2004 14:39 Type: P Check: 113
Found using 'seq23' (hayes346.key)

1 DSELTQPTTMAASPGKITTCSASSISNNLHWYQQPGFSPKLLIYRTSNLAS
33 36

1 match found in sequence:

abu56842 ; BoNT/A Hc binding antibody scTv VL region from 1F3 #1.
(from "bt_ags.pep")
TOIG of: abu56842 check: 9986 from: 1 to: 57

ID ABU56842 standard; protein; 57 AA.

XX AC ABU56842;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 1F3 #1.

XX

KW

KW

XX

OS

XX

PN

XX

PD

XX

PF

XX

PR

XX

PA

XX

PI

XX

DR

XX

PT

XX

PT

XX

PS

XX

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

XX

SQ

Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region; scFv; antibody; botulism; antibacterial; single chain antibody; VL; immunoglobulin.

Mus sp.

US2002155114-A1.

24-OCT-2002.

31-AUG-1998; 98US-00144886.

31-AUG-1998; 98US-00144886.

(MARK/) MARKS J D.

(AMER/) AMERSDORFER P.

Marks JD, Amersdorfer P;

WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 9; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H_c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the treatment of pathologies quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 57 AA;

ABU56842 Length: 57 August 31, 2004 14:39 Type: P Check: 9986
Found using 'seq23' (hayes346.key)

1 DIELTQSPASMSASPGKVTMTCRATSSVSSYLHWYQQKSGSPKLIWYSANLAS
33 36

4 matches found in sequence:

abu56843 ; BoNT/A Hc binding antibody scTv VH region from C15 #2.
(from "bt_ags.pep")
TOIG of: abu56843 check: 9807 from: 1 to: 59

ID ABU56843 standard; protein; 59 AA.

XX AC ABU56843;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VH region from C15 #2.

XX

Thu Sep 2 08:56:11 2004

KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
XX Mus sp.
XX
XX US2002155114-A1.
XX
XX 24-OCT-2002.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX
XX Marks JD, Amersdorfer P;
XX
XX WPI; 2003-182618/18.
XX
XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.
XX
XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C35, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody expressed by any of the
XX novel clones and isolating an antibody that specifically binds to the
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX chain variable region complementarity determining region) and with a
XX second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX antibody binds to a different epitope than the first anti-BoNT/A
XX antibody. The antibody is useful in the treatment of pathologies
XX associated with botulinum neurotoxin poisoning, for rapid
XX detection/diagnosis of botulism and in the detection and/or
XX quantification of BoNT/A in a biological sample obtained from an organism.
XX which is indicative of a Clostridium botulinum infection of the organism.
XX The present sequence is a heavy chain variable region (VH) of a single
XX chain antibody (scFv) of the invention
XX
XX Sequence 59 AA;
SQ

ABU56843 Length: 59 August 31, 2004 14:39 Type: P Check: 9807 ..
Found using 'seq23' (hayes346.key)

1 MATLTVDKSSSTAYMQLSSPTSDSAVYICARIGYDYDYGNYANDYWCQGTIVTASS
14 17 28 31 35 38 43 46

4 matches found in sequence:
abu56844 ; BoNT/A Hc binding antibody scTv VH region from 1A1 #2.
(from "bt_ags.pep")
TOIG of: abu56844 check: 1191 from: 1 to: 57

ID ABU56844 standard; protein; 57 AA.
XX
XX AC ABU56844;
XX
XX 04-APR-2003 (first entry)
XX
XX BoNT/A Hc binding antibody scTv VH region from 1A1 #2.
XX
XX

KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
XX Mus sp.
XX
XX US2002155114-A1.
XX
XX 24-OCT-2002.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX
XX Marks JD, Amersdorfer P;
XX
XX WPI; 2003-182618/18.
XX
XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.
XX
XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C35, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody expressed by any of the
XX novel clones and isolating an antibody that specifically binds to the
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX chain variable region complementarity determining region) and with a
XX second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX antibody binds to a different epitope than the first anti-BoNT/A
XX antibody. The antibody is useful in the treatment of pathologies
XX associated with botulinum neurotoxin poisoning, for rapid
XX detection/diagnosis of botulism and in the detection and/or
XX quantification of BoNT/A in a biological sample obtained from an organism.
XX which is indicative of a Clostridium botulinum infection of the organism.
XX The present sequence is a heavy chain variable region (VH) of a single
XX chain antibody (scFv) of the invention
XX
XX Sequence 57 AA;
SQ

ABU56844 Length: 57 August 31, 2004 14:39 Type: P Check: 1191 ..

Found using 'seq23' (hayes346.key)

1 RFTISRDNKNTLYLQMSLKSSEDYAMCYVRHGYGNYSHWYFDVWGAGTTVTSS
14 17 28 31 35 38 43 46

4 matches found in sequence:
abu56845 ; BoNT/A Hc binding antibody scTv VH region from 1B3 #2.
(from "bt_ags.pep")
TOIG of: abu56845 check: 6644 from: 1 to: 56

ID ABU56845 standard; protein; 56 AA.
XX
XX AC ABU56845;
XX
XX 04-APR-2003 (first entry)
XX
XX BoNT/A Hc binding antibody scTv VH region from 1B3 #2.
XX
XX

KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

OS Mus sp.
 XX US2002155114-A1.
 XX 24-OCT-2002.

XX 31-AUG-1998; 98US-00144886.
 XX 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;
 XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the treatment of pathologies
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention

XX Sequence 56 AA;

ABU56845 Length: 56 August 31, 2004 14:39 Type: P Check: 6644 ..
 Found using 'seq23' (hayes346.key)

1 RETISRDNKNTLYLQNSLRADTAIVYCARDWSEGYYYGMDVWGQGTIVVSS
 14 17 28 31 38 41 40 43
 |---| |---| |---|

4 matches found in sequence:
 abu56846 ; BoNT/A Hc binding antibody scTv VH region from 1F3 #2.
 (from "bt_ags.pep")
 TOIG of: abu56846 check: 3500 from: 1 to: 53

ID ABU56846 standard; protein; 53 AA.
 XX ABU56846;
 AC ABU56848;
 XX 04-APR-2003 (first entry)
 DT
 XX

DE
 XX

BoNT/A Hc binding antibody scTv VH region from 1F3 #2.
 Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 immunoglobulin.

Mus sp.

US2002155114-A1.

24-OCT-2002.

31-AUG-1998; 98US-00144886.

31-AUG-1998; 98US-00144886.

(MARK/) MARKS J D.
 (AMER/) AMERSDORFER P.

Marks JD, Amersdorfer P;

WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum
 neurotoxin type A useful for neutralizing botulinum neurotoxin and
 treating botulism.

Claim 22; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to
 an epitope specifically bound by an antibody expressed by a clone such as
 clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 which is specifically bound by the antibody, where the polypeptide is not
 a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
 antibody that neutralises BoNT/A (by contacting several antibodies with
 an epitope specifically bound by an antibody expressed by any of the
 novel clones and isolating an antibody that specifically binds to the
 epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 chain variable region complementarity determining region) and with a
 second anti-BoNT/A antibody which comprises a VH CDR, where the second
 antibody binds to a different epitope than the first anti-BoNT/A
 associated with botulinum neurotoxin poisoning, for rapid
 detection/diagnosis of botulism and in the treatment of pathologies
 quantification of BoNT/A in a biological sample obtained from an organism
 which is indicative of a Clostridium botulinum infection of the organism.
 The present sequence is a heavy chain variable region (VH) of a single
 chain antibody (scFv) of the invention

Sequence 53 AA;

ABU56846 Length: 53 August 31, 2004 14:39 Type: P Check: 3500 ..
 Found using 'seq23' (hayes346.key)

1 KATLTVDKFSSTAYMELSLTSEDSAVYYCAREAYGYNFWDMGTGTTTVSS
 14 17 28 31 35 38 37 40
 |---| |---| |---|

1 match found in sequence:
 abu56848 ; BoNT/A Hc binding antibody scTv VL region from 1A1 #2.
 (from "bt_ags.pep")
 TOIG of: abu56848 check: 8750 from: 1 to: 53

ID ABU56848 standard; protein; 53 AA.
 XX ABU56848;
 AC ABU56848;
 XX

Thu Sep 2 08:56:11 2004

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DT 04-APR-2003 (first entry)
XX BoNT/A Hc binding antibody scTv VL region from 1A1 #2.
DE BoNT/A Hc binding antibody scTv VL region from 1F3 #2.
XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX Mus sp.
OS
XX US2002155114-A1.
XX 24-OCT-2002.
XX 31-AUG-1998; 98US-00144886.
XX 31-AUG-1998; 98US-00144886.
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX Claim 8; Page 23; 31pp; English.
XX The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H3C fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a light chain variable region (VL) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 53 AA;
ABU56848 Length: 53 August 31, 2004 14:39 Type: P Check: 8750 ...
Found using 'seq23' (hayes346.key)
1 GVPARFGSGSRDFTLTIDPVEADDAATYCCQNNEDPYTFQGGTKLEIKR
|---|
40 43
-----
1 match found in sequence:
abu56850; BoNT/A Hc binding antibody scTv VL region from 1F3 #2.
(from "bt_ags.pep")
TOIG of: abu56850 check: 6415 from: 1 to: 52
ID ABU56850 standard; protein; 52 AA.
XX
XX AC ABU56850;
XX
```

```
DT 04-APR-2003 (first entry)
XX BoNT/A Hc binding antibody scTv VL region from 1A1 #2.
DE BoNT/A Hc binding antibody scTv VL region from 1F3 #2.
XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX Mus sp.
OS
XX US2002155114-A1.
XX 24-OCT-2002.
XX 31-AUG-1998; 98US-00144886.
XX 31-AUG-1998; 98US-00144886.
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX Claim 8; Page 23; 31pp; English.
XX The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H3C fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a light chain variable region (VL) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 52 AA;
ABU56850 Length: 52 August 31, 2004 14:39 Type: P Check: 6415 ...
Found using 'seq23' (hayes346.key)
1 GVPSRFGSGSGTSYSLTISVVEADDAATYCCQYICGYPTFGGKLEIKR
|---|
35 38
-----
2 matches found in sequence:
abu56855; BoNT/A Hc binding antibody scTv VH region from 1B6 #1.
(from "bt_ags.pep")
TOIG of: abu56855 check: 1949 from: 1 to: 66
ID ABU56855 standard; protein; 66 AA.
XX
XX AC ABU56855;
XX
```

DT 04-APR-2003 (first entry)
 XX BoNT/A Hc binding antibody scTv VH region from 1B6 #1.
 DE Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.
 XX Mus sp.
 OS US2002155114-A1.
 XX 24-OCT-2002.
 XX 31-AUG-1998; 98US-00144886.
 XX 31-AUG-1998; 98US-00144886.
 XX (MARK/) MARKS J D.
 PA (AMER/) AMERSDORFER P.
 XX Marks JD, Amersdorfer P;
 XX WPI; 2003-182618/18.
 XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX Claim 6; Page 22; 3lpp; English.
 XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX Sequence 66 AA;
 SQ ABU56855 Length: 66 August 31, 2004 14:39 Type: P Check: 1949 ..
 Found using 'seq23' (hayes346.key)

1 QVQKQSGNELVRPGVSVKISKCKSGYTFIDYAVHWKQSPAKSLEWIGVSYGDTDY
 27 30
 --|
 61 NPKFKG 63

2 matches found in sequence:
 abu56856 ; BoNT/A Hc binding antibody scTv VH region from 1C9 #1.
 (from "bt_ags.pep")
 TOIG of: abu56856 check: 2108 from: 1 to: 66

ID ABU56856 standard; protein; 66 AA.
 XX AC ABU56856;
 XX DT 04-APR-2003 (first entry)
 XX DE BoNT/A Hc binding antibody scTv VH region from 1C9 #1.
 XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.
 XX Mus sp.
 OS US2002155114-A1.
 XX 24-OCT-2002.
 XX 31-AUG-1998; 98US-00144886.
 XX 31-AUG-1998; 98US-00144886.
 XX (MARK/) MARKS J D.
 PA (AMER/) AMERSDORFER P.
 XX Marks JD, Amersdorfer P;
 XX WPI; 2003-182618/18.
 XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX Claim 6; Page 22; 3lpp; English.
 XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX Sequence 66 AA;
 SQ ABU56856 Length: 66 August 31, 2004 14:39 Type: P Check: 2108 ..
 Found using 'seq23' (hayes346.key)

1 QVQKQSGNELVRPGVSVKISKCKSGYTFIDYAVHWKQSHAKSLEWIGVISTYGDADY
 27 30
 |--|
 61 NPKFKG 55 58

1 match found in sequence:
 abu56857 ; BoNT/A Hc binding antibody scTv VH region from 1E8 #1.
 (from "bt_ags.pep")

Thu Sep 2 08:56:11 2004

abu56858 ; BoNT/A Hc binding antibody scTv VH region from 1G7 #1.

(from "bt ags.pep")

TOIG of: abu56858 check: 3741 from: 1 to: 65

ABU56858 standard; protein; 65 AA.

ID XX
AC XX
XX XX
DT XX
XX XX
DE XX
XX XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX XX
OS Mus sp.
XX XX
PN US2002155114-A1.
XX XX
PD 24-OCT-2002.
XX XX
PF 31-AUG-1998; 98US-00144886.
XX XX
PR 31-AUG-1998; 98US-00144886.
XX XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX XX
PI Marks JD, Amersdorfer P;
XX XX
DR WPI; 2003-182618/18.
XX XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX XX

Claim 6; Page 22; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin Hc fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 65 AA;

ABU56858 Length: 65 August 31, 2004 14:39 Type: P Check: 3741
Found using 'seq23' (hayes346.key)

1 EVQLQESGPGLVKPSQSLTCTVTGYITDYAWNIWIRQPGKKLEWMGYISYSGTGYN
50 53

61 PSLKS

2 matches found in sequence:

TOIG of: abu56857 check: 3344 from: 1 to: 65

ABU56857 standard; protein; 65 AA.

ID XX
AC ABU56857;
XX XX
DT 04-APR-2003 (first entry)
XX XX
DE BoNT/A Hc binding antibody scTv VH region from 1B8 #1.
XX XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX XX
OS Mus sp.
XX XX
PN US2002155114-A1.
XX XX
PD 24-OCT-2002.
XX XX
PF 31-AUG-1998; 98US-00144886.
XX XX
PR 31-AUG-1998; 98US-00144886.
XX XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX XX
PI Marks JD, Amersdorfer P;
XX XX
DR WPI; 2003-182618/18.
XX XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX XX

Claim 6; Page 22; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin Hc fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 65 AA;

ABU56857 Length: 65 August 31, 2004 14:39 Type: P Check: 3344
Found using 'seq23' (hayes346.key)

1 EVQLQESGPGLVKPSQSLTCTVTGYITDYAWNIWIRQPGKKLEWMGYISYSGTGYN
50 53

61 PSLKS

1 match found in sequence:
abu56859 ; BoNT/A Hc binding antibody scTv VH region from 1F1 #1.
(from "bt_ags.pep")
TOIG of: abu56859 check: 2361 from: 1 to: 66

ID ABU56859 standard; protein; 66 AA.
XX AC ABU56859;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VH region from 1F1 #1.
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.
XX OS Mus sp.
XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX PI WPI; 2003-182618/18.
XX DR Novel antibody that specifically binds and neutralizes botulinum
XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX PT treating botulism.
XX PS Claim 6; Page 22; 31pp; English.
XX CC The invention relates to an isolated antibody that specifically binds to
XX CC an epitope specifically bound by an antibody expressed by a clone such as
XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX CC which is specifically bound by the antibody, where the polypeptide is not
XX CC a full-length botulinum neurotoxin H_c fragment and making an anti-BoNT/A
XX CC antibody that neutralises BoNT/A (by contacting several antibodies with
XX CC an epitope specifically bound by the antibody, where the polypeptide is not
XX CC novel clones and isolating an antibody expressed by any of the
XX CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX CC chain variable region complementarity determining region) and with a
XX CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX CC antibody binds to a different epitope than the first anti-BoNT/A
XX CC antibody. The antibody is useful in the treatment of pathologies
XX CC associated with botulinum neurotoxin poisoning, for rapid
XX CC detection/diagnosis of botulism and in the detection and/or
XX CC quantification of BoNT/A in a biological sample obtained from an organism
XX CC which is indicative of a Clostridium botulinum infection of the organism.
XX CC The present sequence is a heavy chain variable region (VH) of a single
XX CC chain antibody (scFv) of the invention
XX SQ Sequence 66 AA;

ABU56859 Length: 66 August 31, 2004 14:39 Type: P Check: 2361 ..
Found using 'seq23' (hayes346.key)

SGGGLVQPGSLKSCAASGFTFSNYGMSWVRQTPDKRLIEWAMISSGGSYNYDSVKG

7

67

2 matches found in sequence:
abu56860 ; BoNT/A Hc binding antibody scTv VH region from C39 #1.
(from "bt_ags.pep")
TOIG of: abu56860 check: 2240 from: 1 to: 66

ID ABU56860 standard; protein; 66 AA.
XX AC ABU56860;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VH region from C39 #1.
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.
XX OS Mus sp.
XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX PI WPI; 2003-182618/18.
XX DR Novel antibody that specifically binds and neutralizes botulinum
XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX PT treating botulism.
XX PS Claim 6; Page 22; 31pp; English.
XX CC The invention relates to an isolated antibody that specifically binds to
XX CC an epitope specifically bound by an antibody expressed by a clone such as
XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX CC which is specifically bound by the antibody, where the polypeptide is not
XX CC a full-length botulinum neurotoxin H_c fragment and making an anti-BoNT/A
XX CC antibody that neutralises BoNT/A (by contacting several antibodies with
XX CC an epitope specifically bound by an antibody expressed by any of the
XX CC novel clones and isolating an antibody that specifically binds to the
XX CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX CC chain variable region complementarity determining region) and with a
XX CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX CC antibody binds to a different epitope than the first anti-BoNT/A
XX CC antibody. The antibody is useful in the treatment of pathologies
XX CC associated with botulinum neurotoxin poisoning, for rapid
XX CC detection/diagnosis of botulism and in the detection and/or
XX CC quantification of BoNT/A in a biological sample obtained from an organism
XX CC which is indicative of a Clostridium botulinum infection of the organism.
XX CC The present sequence is a heavy chain variable region (VH) of a single
XX CC chain antibody (scFv) of the invention
XX SQ Sequence 66 AA;

ABU56860 Length: 66 August 31, 2004 14:39 Type: P Check: 2240 ..
Found using 'seq23' (hayes346.key)

| | | | |
|----|--|----|----|
| 1 | QYQLQESGGGVKPGGSLKLSCAASGFTFDYVMSWVQRTPEKRLWEVATISDGGSYTTY | -- | -- |
| | | 33 | 36 |
| 61 | PDSVKG | | |

3 matches found in sequence:
 abu56861 ; BoNT/A Hc binding antibody scTv VH region from C25 #1.
 (from "bt_ags pep")
 TOIG of: abu56861 check: 2373 from: 1 to: 66
 ID ABU56861 standard: protein; 66 AA.

XX 04-APR-2003 (first entry)
XX BONT/A Hc binding antibody scTv VH region from C25 #1.
XX
XX
XX Botulinum neurotoxin type A; BONT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.

[illegible]

| | | |
|----|----------------------------|--|
| XX | 24-OCT-2002.. | |
| XX | | |
| XX | 31-AUG-1998; 98US-00144886 | |
| PF | | |
| XX | | |
| XX | 31-AUG-1998; 98US-00144886 | |
| PR | | |
| XX | | |
| XX | (MARK//) MARKS J D. | |
| PA | (AMER//) AMERSDORFER P. | |
| PA | | |

| | |
|----|--|
| PI | Marks JD, Amersdorfer P; |
| XX | |
| DR | WPI; 2003-182618/18. |
| XX | |
| PT | Novel antibody that specifically binds and neutralizes botulinum |
| PT | neurotoxin type A useful for neutralizing botulinum neurotoxin and |
| PT | treating botulism. |
| PT | |

XX Claim 6; Page 22; 31pp; English.
PS
PS
XX the invention relates to an isolated antibody that specifically binds to

an epitope specifically bound by an antibody expressed by any of the
 clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 which is specifically bound by the antibody, where the polypeptide is not
 a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 antibody that neutralises BoNT/A (by contacting several antibodies with
 an epitope specifically bound by an antibody expressed by any of the
 novel clones and isolating an antibody that specifically binds to the
 epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 chain variable region complementarity determining region) and with a
 second anti-BoNT/A antibody which comprises a VH CDR, where the second
 antibody binds to a different epitope than the first anti-BoNT/A
 antibody. The antibody is useful in the treatment of pathologies
 associated with botulinum neurotoxin poisoning, for rapid
 detection/diagnosis of botulism and in the detection and/or
 quantification of BoNT/A in a biological sample obtained from an organism
 which is indicative of a Clostridium botulinum infection of the organism.
 The present sequence is a heavy chain variable region (VH) of a single
 chain antibody (scFv) of the invention

CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX Sequence 66 Aa;
SQ ABU56861 Length: 66 August 31, 2004 14:39 Type: P Check: 2373 ..

XX SQ Sequence 66 AA;
 ABUS6862 Length: 66 August 31, 2004 14:39 Type: P Check: 1873 ..
 Found using 'seq23' (hayes346.key)
 ...
 7 SGGGLVKGSLKLSAASGFTSSYMSWVRQTPEKRLWVATISDGGTYTYTNDVKG
 57 60

 1 match found in sequence:
 abu56863 ; BoNT/A Hc binding antibody scTv VH region from 3C3 #1.
 (from "bt_ags pep")
 TOIG of: abu56863 check: 1848 from: 1 to: 66
 ID ABUS6863 standard; protein; 66 AA.
 XX AC ABUS6863;
 XX DT 04-APR-2003 (first entry)
 XX DE BoNT/A Hc binding antibody scTv VH region from 3C3 #1.
 XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 XX KW immunoglobulin.
 XX OS Mus sp.
 XX PN US2002155114-A1.
 XX PD 24-OCT-2002.
 XX PF 31-AUG-1998; 98US-00144886.
 XX PR 31-AUG-1998; 98US-00144886.
 XX PA (MARK/) MARKS J D.
 XX PA (AMER/) AMERSDORFER P.
 XX PI Marks JD, Amersdorfer P;
 XX DR WPI; 2003-182618/18.
 XX PS Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX Claim 6; Page 22; 31pp; English.
 CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or

CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX SQ Sequence 66 AA;
 ABUS6863 Length: 66 August 31, 2004 14:39 Type: P Check: 1848 ..
 Found using 'seq23' (hayes346.key)
 ...
 7 SGGGLVKGSLKLSAASGFTSSYMSWVRQTPEKRLWVATISDGGTYTYTNDVKG
 57 60

 1 match found in sequence:
 abu56867 ; BoNT/A Hc binding antibody scTv VH region from 2B6 #1.
 (from "bt_ags pep")
 TOIG of: abu56867 check: 2155 from: 1 to: 65
 ID ABUS6867 standard; protein; 65 AA.
 XX AC ABUS6867;
 XX DT 04-APR-2003 (first entry)
 XX DE BoNT/A Hc binding antibody scTv VH region from 2B6 #1.
 XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 XX KW immunoglobulin.
 XX OS Mus sp.
 XX PN US2002155114-A1.
 XX PD 24-OCT-2002.
 XX PF 31-AUG-1998; 98US-00144886.
 XX PR 31-AUG-1998; 98US-00144886.
 XX PA (MARK/) MARKS J D.
 XX PA (AMER/) AMERSDORFER P.
 XX PI Marks JD, Amersdorfer P;
 XX DR WPI; 2003-182618/18.
 XX PS Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX Claim 6; Page 22; 31pp; English.
 CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second

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CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX
XX
SQ Sequence 65 AA;

ABU56867 Length: 65 August 31, 2004 14:39 Type: P Check: 2155
Found using 'seq23' (hayes346.key)

1 VKLVESGFLVKPSQSLTCTVTGYSITSDYAWNIRQFPFNKLEWMGYINDGNNYN
50 53

61 PSLKN

1 match found in sequence:
abu56871; BoNT/A Hc binding antibody scTv VL region from C9 #1.
(from 'bct_ags.pep')
TOIG of: abu56871 check: 1782 from: 1 to: 55

ID ABU56871 standard; protein; 55 AA.
XX
XX AC ABU56871;
XX
XX DT 04-APR-2003 (first entry)
XX
XX DE BoNT/A Hc binding antibody scTv VL region from C9 #1.
XX
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.
XX
XX OS Mus sp.
XX
XX PN US2002155114-A1.
XX
XX PD 24-OCT-2002.
XX
XX PF 31-AUG-1998; 98US-00144886.
XX
XX PR 31-AUG-1998; 98US-00144886.
XX
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX
XX PI Marks JD, Amersdorfer P;
XX
XX WPI; 2003-182618/18.
XX
XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.
XX
XX Claim 9; Page 22; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C35, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody that specifically binds to the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a light chain variable region (VL) of a single
CC chain antibody (scFv) of the invention
XX
XX
SQ Sequence 55 AA;

ABU56871 Length: 55 August 31, 2004 14:39 Type: P Check: 1782
Found using 'seq23' (hayes346.key)

1 DIETQSPALMSSSPGKVIITCSASSSVSYMHWFQKPGTSPKPIVYSTGNLAS
31 34

1 match found in sequence:
abu56873; BoNT/A Hc binding antibody scTv VL region from C1 #1.
(from 'bct_ags.pep')
TOIG of: abu56873 check: 1736 from: 1 to: 55

ID ABU56873 standard; protein; 55 AA.
XX
XX AC ABU56873;
XX
XX DT 04-APR-2003 (first entry)
XX
XX DE BoNT/A Hc binding antibody scTv VL region from C1 #1.
XX
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.
XX
XX OS Mus sp.
XX
XX PN US2002155114-A1.
XX
XX PD 24-OCT-2002.
XX
XX PF 31-AUG-1998; 98US-00144886.
XX
XX PR 31-AUG-1998; 98US-00144886.
XX
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX
XX PI Marks JD, Amersdorfer P;
XX
XX WPI; 2003-182618/18.
XX
XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.
XX
XX Claim 9; Page 22; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C35, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody that specifically binds to the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX
XX
SQ Sequence 55 AA;

ABU56873 Length: 55 August 31, 2004 14:39 Type: P Check: 1736 ..
Found using 'seq23' (hayes346.key)

1 DIETQSPAIMSAPGKVINWTCSSSVSYMYQQKPGSGSPRLIIYDTSNLAS
31 34

1 match found in sequence:
abu56877 ; BoNT/A Hc binding antibody scTv VL region from 1E8 #1.
(from "bt_ags.pep")
TOIG of: abu56877 check: 1645 from: 1 to: 55

ID ABU56877 standard; protein; 55 AA.

XX AC ABU56877;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 1E8 #1.

XX DE Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX PS Claim 9; Page 22; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H-c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a light chain variable region (VL) of a single
CC chain antibody (scFv) of the invention

XX
XX
SQ Sequence 55 AA;

ABU56877 Length: 55 August 31, 2004 14:39 Type: P Check: 1645 ..
Found using 'seq23' (hayes346.key)

1 DIETQSPAIMSAPGKVINWTCSSSVSYMYQQKSGTSPKRWIYDTSKLAS
31 34

1 match found in sequence:
abu56878 ; BoNT/A Hc binding antibody scTv VL region from 1G7 #1.
(from "bt_ags.pep")
TOIG of: abu56878 check: 1645 from: 1 to: 55

ID ABU56878 standard; protein; 55 AA.

XX AC ABU56878;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 1G7 #1.

XX DE Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX PS Claim 9; Page 22; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H-c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX Sequence 55 AA;

ABU56878 Length: 55 August 31, 2004 14:39 Type: P Check: 1645 ..
Found using 'seq23' (hayes346.key)

1 DIELTQSPAIMSASPGKVTTCSSASSSVSYMHVYQQRSGTSPKRWIYDTSKLAS
31 34

1 match found in sequence:

abu56882 ; BoNT/A Hc binding antibody scTv VL region from 2G5 #1.
(from "bt_ags.pep")
TOIG of: abu56882 check: 1851 from: 1 to: 55

ID ABU56882 standard; protein; 55 AA.

XX AC ABU56882;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 2G5 #1.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX PS Claim 9; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX Sequence 55 AA;

ABU56882 Length: 55 August 31, 2004 14:39 Type: P Check: 1851 ..
Found using 'seq23' (hayes346.key)

1 DIELTQSPAIMSASPGKVTTCSSASSSVSYMHVYQQRSGTSPKRWIYDTSKLAS
31 34

1 match found in sequence:

abu56884 ; BoNT/A Hc binding antibody scTv VL region from 3F4 #1.
(from "bt_ags.pep")
TOIG of: abu56884 check: 2125 from: 1 to: 55

ID ABU56884 standard; protein; 55 AA.

XX AC ABU56884;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 3F4 #1.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX PS Claim 9; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX Sequence 55 AA;

ABU56884 Length: 55 August 31, 2004 14:39 Type: P Check: 2125 ..
Found using 'seq23' (hayes346.key)

1 DTELTPAIVMSAPGKVTTCRASSSVSYMYQQKPGSPRLIIYDTSNLAS
31 34

1 match found in sequence:
abu56885 ; BoNT/A Hc binding antibody scTv VL region from 3H4 #1.
(from "bt_ags.pep")
TOIG of: abu56885 check: 675 from: 1 to: 57

ID ABU56885 standard; protein; 57 AA.
XX AC ABU56885;
XX DT 04-APR-2003 (first entry)
XX BoNT/A Hc binding antibody scTv VL region from 3H4 #1.
XX DE Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX KW immunoglobulin.
XX OS Mus sp.

XX US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.

XX Claim 9; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody expressed by any of the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a light chain variable region (VL) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 57 AA;

ABU56885 Length: 57 August 31, 2004 14:39 Type: P Check: 675 ..
Found using 'seq23' (hayes346.key)

1 DIELTQPAIVMSAPGKVTTCRASSSVSYLHWYQQKPGSPRLIIYDTSNLAS
33 36

1 match found in sequence:
abu56887 ; BoNT/A Hc binding antibody scTv VL region from 2B6 #1.
(from "bt_ags.pep")
TOIG of: abu56887 check: 252 from: 1 to: 60

ID ABU56887 standard; protein; 60 AA.

XX AC ABU56887;

XX DT 04-APR-2003 (first entry)

XX BoNT/A Hc binding antibody scTv VL region from 2B6 #1.

XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.

XX OS Mus sp.

XX US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.

XX Claim 9; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody expressed by any of the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-Bont/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-Bont/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of Bont/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 60 AA;
ABU56897 Length: 60 August 31, 2004 14:39 Type: P Check: 252 ..
Found using 'seq23' (hayes346.key)

1 YIELTQSPASLAVSLGQRATTSCTV VL region from 2E8 #1.
1 4

1 match found in sequence:
abu56890 ; Bont/A Hc binding antibody scTv VL region from 2E8 #1.
(from "bt_ags.pep")
TOIG of: abu56890 check: 9244 from: 1 to: 57

ID ABU56890 standard; protein; 57 AA.
XX
AC ABU56890;
XX
DT 04-APR-2003 (first entry)
XX
DE Bont/A Hc binding antibody scTv VL region from 2E8 #1.
XX
KW Botulinum neurotoxin type A; Bont/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
FN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
DR WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 9; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (Bont/A). Also included are a
CC polypeptide comprising Bont/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H₃c fragment and making an anti-Bont/A
CC antibody that neutralises Bont/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the

epitope). The antibody is useful for neutralising a Bont/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-Bont/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-Bont/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of Bont/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 57 AA;
ABU56890 Length: 57 August 31, 2004 14:39 Type: P Check: 9244 ..
Found using 'seq23' (hayes346.key)

1 DIELTQSTTMAASPGEXITITCSASSISGNYLHWYQKPGFSPKLLIYRTSNLAS
33 36

3 matches found in sequence:
abu56891 ; Bont/A Hc binding antibody scTv VH region from C9 #2.
(from "bt_ags.pep")
TOIG of: abu56891 check: 121 from: 1 to: 52

ID ABU56891 standard; protein; 52 AA.
XX
AC ABU56891;
XX
DT 04-APR-2003 (first entry)
XX
DE Bont/A Hc binding antibody scTv VH region from C9 #2.
XX
KW Botulinum neurotoxin type A; Bont/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
FN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
DR WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (Bont/A). Also included are a
CC polypeptide comprising Bont/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H₃c fragment and making an anti-Bont/A
CC antibody that neutralises Bont/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the

CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 CC
 XX Sequence 52 AA;
 SQ

ABU56891 Length: 52 August 31, 2004 14:39 Type: P Check: 121 ..
 Found using 'seq23' (hayes346.key)

1 MATLTVDKSSSTAYMQLSSPTSCARGIYVYVDGNYVAMDYWGQGTTLTVSS
 14 17 28 31 36 39

 4 matches found in sequence:
 abu56892 ; BoNT/A Hc binding antibody scFv VH region from 1D5 #2.
 (from "bt ags.pep")
 TOIG of: abu56892 check: 1643 from: 1 to: 59

ID ABU56892 standard; protein; 59 AA.

XX AC ABU56892;

XX DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scFv VH region from 1D5 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

OS Mus sp.

XX US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

PA (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;

PI WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₃ fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the

CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 CC
 XX Sequence 59 AA;
 SQ

ABU56892 Length: 59 August 31, 2004 14:39 Type: P Check: 1643 ..
 Found using 'seq23' (hayes346.key)

1 KATLTVDKSSSTAYMQLSSPTSCARGIYVYVDGNYVYTLVDYWGQGTTLTVSS
 14 17 28 31 35 38 43 46

 3 matches found in sequence:
 abu56893 ; BoNT/A Hc binding antibody scFv VH region from C1 #2.
 (from "bt ags.pep")
 TOIG of: abu56893 check: 2318 from: 1 to: 55

ID ABU56893 standard; protein; 55 AA.

XX AC ABU56893;

XX DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scFv VH region from C1 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

OS Mus sp.

XX US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

PA (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;

PI WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₃ fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the

CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 55 AA;
SQ

ABU56893 Length: 55 August 31, 2004 14:39 Type: P Check: 2318 ..
Found using 'seq23' (hayes346.key)

1 KATLTVDRSSSTAIHQSSPTSDSAVYICARGLYGFGWFDVWGQGTITVVS
28 31 37 40 41 44
|---| |---| |---|

4 matches found in sequence:
abu56894 ; BoNT/A Hc binding antibody scTv VH region from S25 #2.
(from "bt_ags.pep")
TOIG of: abu56894 check: 8151 from: 1 to: 54

ID ABU56894 standard; protein; 54 AA.
XX
AC ABU56894;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VH region from S25 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
PI WPI; 2003-182618/18.
XX
DR Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
PT
XX
PS Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 54 AA;
SQ

ABU56894 Length: 54 August 31, 2004 14:39 Type: P Check: 8151 ..
Found using 'seq23' (hayes346.key)

1 KATLTVDRSSSTAYMQLSPTSDSAVYICARGLYNGFWFDVWGQGTITVVS
14 17 28 31 35 38 43
|---| |---| |---| |---|

2 matches found in sequence:
abu56895 ; BoNT/A Hc binding antibody scTv VH region from 1B6 #2.
(from "bt_ags.pep")
TOIG of: abu56895 check: 3665 from: 1 to: 51

ID ABU56895 standard; protein; 51 AA.
XX
AC ABU56895;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VH region from 1B6 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
PI WPI; 2003-182618/18.
XX
DR Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
PT
XX
PS Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 CC XX
 CC SQ Sequence 51 AA;

ABU56895 Length: 51 August 31, 2004 14:39 Type: P Check: 3665 ..
 Found using 'seq23' (hayes346.key)

1 KATLVNKKSSNTAYWEELRLTSDSAIYYCARRGKGMDYWGQGTFTVTSV
 14 17 28 31

 2 matches found in sequence:

abu56896 ; BoNT/A Hc binding antibody scFv VH region from 1C9 #2.
 (from "bt_ags.pep")

TOIG of: abu56896 check: 3982 from: 1 to: 51

ID ABU56896 standard; protein; 51 AA.

XX AC ABU56896;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scFv VH region from 1C9 #2.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.
 XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 CC XX
 CC SQ Sequence 51 AA;

ABU56895 Length: 51 August 31, 2004 14:39 Type: P Check: 3982 ..
 Found using 'seq23' (hayes346.key)

1 KATLVNKKSSNTAYWEELRLTSDSAIYYCARRGKGMDYWGQGTFTVTSV
 14 17 28 31

 2 matches found in sequence:

abu56897 ; BoNT/A Hc binding antibody scFv VH region from 1E8 #2.
 (from "bt_ags.pep")

TOIG of: abu56897 check: 719 from: 1 to: 50

ID ABU56897 standard; protein; 50 AA.

XX AC ABU56897;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scFv VH region from 1E8 #2.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.
 XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

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an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 50 AA;
ABU56898 Length: 50 August 31, 2004 14:39 Type: P Check: 761 ..
Found using 'seq23' (hayes346.key)

1 RISITRDTSKNQFFLQLNSVTETDTGYCARGYDAMDYWGQGTSTVTVSS
28 31 34 37

3 matches found in sequence:
abu56899 ; BoNT/A Hc binding antibody scFv VH region from 1F1 #2.
(from "bt_ags.pep")
TOIG of: abu56899 check: 1526 from: 1 to: 57

ID ABU56899 standard; protein; 57 AA.
XX
AC ABU56899;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scFv VH region from 1F1 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
DR WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 50 AA;
ABU56897 Length: 50 August 31, 2004 14:39 Type: P Check: 719 ..
Found using 'seq23' (hayes346.key)

1 RISITKDTSKNQFFLQLNSVTETDTGYCARGYDAMDYWGQGTSTVTVSS
28 31 34 37

2 matches found in sequence:
abu56898 ; BoNT/A Hc binding antibody scFv VH region from 1G7 #2.
(from "bt_ags.pep")
TOIG of: abu56898 check: 761 from: 1 to: 50

ID ABU56898 standard; protein; 50 AA.
XX
AC ABU56898;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scFv VH region from 1G7 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
DR WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 57 AA;

ABU56999 Length: 57 August 31, 2004 14:39 Type: P Check: 1526 ..
 Found using 'seq23' (hayes346.key)

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1  RVTTISRDNAKSTLYLQMSLQSEDYAMVLCTRYGYGNPSPHWFDVWGAGTTVTVSS
    14 17      |---|      |---|      |---|
    35 38 43 46

```

 2 matches found in sequence:

abu56900 ; BoNT/A Hc binding antibody scTv VH region from C39 #2.
 (from "bt_ags pep")

TOIG of: abu56900 check: 9469 from: 1 to: 52

ID ABU56900 standard; protein; 52 AA.

XX AC ABU56900;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VH region from C39 #2.

XX DE Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;

XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;

XX KW immunoglobulin.

XX OS Mus sp.

XX OS US2002155114-A1.

XX PN 24-OCT-2002.

XX PD 31-AUG-1998; 98US-00144886.

XX PF 31-AUG-1998; 98US-00144886.

XX PR (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PA Marks JD, Amersdorfer P;

XX PI WPI; 2003-182618/18.

XX DR Novel antibody that specifically binds and neutralizes botulinum

XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and

XX PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX PS The invention relates to an isolated antibody that specifically binds to

XX CC an epitope specifically bound by an antibody expressed by a clone such as

XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and

XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a

XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope

XX CC which is specifically bound by the antibody, where the polypeptide is not

XX CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A

XX CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 52 AA;

ABU56900 Length: 52 August 31, 2004 14:39 Type: P Check: 9469 ..
 Found using 'seq23' (hayes346.key)

```

1  RFTISRDNAKNLYLQMSLKSLEDTAIYCYVRVYDEGLDYWGQTTVTVSS
    14 17      |---|      |---|      |---|
    28 31

```

 2 matches found in sequence:

abu56901 ; BoNT/A Hc binding antibody scTv VH region from C25 #2.
 (from "bt_ags pep")

TOIG of: abu56901 check: 9258 from: 1 to: 52

ID ABU56901 standard; protein; 52 AA.

XX AC ABU56901;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VH region from C25 #2.

XX DE Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;

XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;

XX KW immunoglobulin.

XX OS Mus sp.

XX OS US2002155114-A1.

XX PN 24-OCT-2002.

XX PD 31-AUG-1998; 98US-00144886.

XX PF 31-AUG-1998; 98US-00144886.

XX PR (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PA Marks JD, Amersdorfer P;

XX PI WPI; 2003-182618/18.

XX DR Novel antibody that specifically binds and neutralizes botulinum

XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and

XX PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX PS The invention relates to an isolated antibody that specifically binds to

XX CC an epitope specifically bound by an antibody expressed by a clone such as

XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and

XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a

XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope

XX CC which is specifically bound by the antibody, where the polypeptide is not

XX CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A

XX CC antibody that neutralises BoNT/A (by contacting several antibodies with

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an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinum and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

XX
SQ Sequence 52 AA;

ABU56901 Length: 52 August 31, 2004 14:39 Type: P Check: 9258 ..
Found using 'seq23' (hayes346.key)

1 RFTISRDNKNNLYLQMSLSKSEDTAMYCSRYRYDDMDYWGQGTSTVTVSS
14 17 35 38

3 matches found in sequence:
abu56902 ; BoNT/A Hc binding antibody scTv VH region from 2G5 #2.
(from "bt_ags.pep")
TOIG of: abu56902 check: 8869 from: 1 to: 52

ID ABU56902 standard; protein; 52 AA.

XX ABU56902;

DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scTv VH region from 2G5 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulinum; antibacterial; single chain antibody; VH;
KW immunoglobulin.

XX Mus sp.

XX US2002155114-A1.

XX 24-OCT-2002.

XX 31-AUG-1998; 98US-00144886.

XX 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

XX (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulinism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinum and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

XX
SQ Sequence 52 AA;

ABU56902 Length: 52 August 31, 2004 14:39 Type: P Check: 8869 ..
Found using 'seq23' (hayes346.key)

1 RFTISRDNKNNLYLQMSLSKSEDTAMYCYCARNLFPYDHYWGQGTSTVTVSS
14 17 28 31 36 39

2 matches found in sequence:
abu56903 ; BoNT/A Hc binding antibody scTv VH region from 2B6 #2.
(from "bt_ags.pep")
TOIG of: abu56903 check: 7963 from: 1 to: 54

ID ABU56903 standard; protein; 54 AA.

XX ABU56903;

DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scTv VH region from 2B6 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulinum; antibacterial; single chain antibody; VH;
KW immunoglobulin.

XX Mus sp.

XX US2002155114-A1.

XX 24-OCT-2002.

XX 31-AUG-1998; 98US-00144886.

XX 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

XX (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulinism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 54 AA;

ABU56903 Length: 54 August 31, 2004 14:39 Type: P Check: 7963 ..
 Found using 'seq23' (hayes346.Key)

1 RISITRDSKNQFLKNSVTSEDTATYTCARAGGYVDVYVWGVTGTTIVVSS
 28 31 38 41

2 matches found in sequence:

abu56904 ; BoNT/A Hc binding antibody scFv VH region from 1G5 #2.
 (from "bt_ags pep")
 TOIG of: abu56904 check: 3980 from: 1 to: 51

ID ABU56904 standard; protein; 51 AA.

XX AC ABU56904;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scFv VH region from 1G5 #2.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
 XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a light chain variable region (VL) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 51 AA;

ABU56904 Length: 51 August 31, 2004 14:39 Type: P Check: 3980 ..
 Found using 'seq23' (hayes346.Key)

1 KATLTVDTSSTAYMQLSLSLTSDESAVYCYCARLGADADVYWGQGTSTIVVSS
 14 17 28 31

1 match found in sequence:

abu56905 ; BoNT/A Hc binding antibody scFv VL region from C9 #2.
 (from "bt_ags pep")
 TOIG of: abu56905 check: 5919 from: 1 to: 52

ID ABU56905 standard; protein; 52 AA.

XX AC ABU56905;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scFv VL region from C9 #2.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
 XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 8; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 52 AA;

ABU56913 Length: 52 August 31, 2004 14:39 Type: P Check: 6002 ..
Found using 'seq23' (hayes346.key)

1 GVPARFSGSGTSYSLTISRMEADAATYYCQQRSSYPYTFQFGDQAGNIK
40 43

1 match found in sequence:
abu56914 ; BoNT/A Hc binding antibody scTv VL region from 3C3 #2.
(from "bt_ags.pep")
TOIG of: abu56914 check: 6418 from: 1 to: 52

ID ABU56914 standard; protein; 52 AA.
XX
AC ABU56914;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from 3C3 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulinism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
PI WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulinism.
XX
PS Claim 8; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, IC6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 52 AA;

ABU56905 Length: 52 August 31, 2004 14:39 Type: P Check: 5919 ..
Found using 'seq23' (hayes346.key)

1 GVPARFSGSGTSYSLTISRMEADAATYYCQQRSSYPYTFQFGDQAGNIK
35 38

1 match found in sequence:
abu56913 ; BoNT/A Hc binding antibody scTv VL region from 2G5 #2.
(from "bt_ags.pep")
TOIG of: abu56913 check: 6002 from: 1 to: 52

ID ABU56913 standard; protein; 52 AA.
XX
AC ABU56913;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from 2G5 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulinism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
PI WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulinism.
XX
PS Claim 8; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, IC6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinum and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 52 AA;

ABU61532 Length: 52 August 31, 2004 14:39 Type: P Check: 6418
Found using 'seq23' (hayes346.key)

1 GVPARFSGSGTSLTISRMEADATYYCQQRSSYPVTFQGGDQAGNIS
40 43

1 match found in sequence:
abu61532 ; Botulinum type A neurotoxin leucine-based motif.
(from "bt_ags.pep")
TOIG of: abu61532 check: 2137 from: 1 to: 7

ID ABU61532 standard; peptide; 7 AA.

XX AC ABU61532;

XX DT 11-AUG-2003 (first entry)

XX DE Botulinum type A neurotoxin leucine-based motif.

XX KW Neurotoxin; analgesic; antispasmodic; antiinflammatory; cerebral palsy;
XX KW biological persistence; biological persistence enhancing component;
XX KW leucine-based motif; neuromuscular disorder; autonomic disorder; pain;
XX KW spasmodic dysphonia; laryngeal dystonia; oromandibular dysphonia;
XX KW lingual dystonia; cervical dystonia; focal hand dystonia; blepharospasm;
XX KW strabismus; hemifacial spasm; eyelid disorder; focal spasticity; tics;
XX KW spasmodic colitis; neurogenic bladder; anismus; limb spasticity; tics;
XX KW tremors; bruxism; anal fissure; achalasia; dysphagia; lacrimation;
XX KW hyperhydrosis; salivation; gastrointestinal secretion; muscle spasm;
XX KW headache pain; brow furrow; skin wrinkle; spinal curvature;
XX KW inflammatory pain; autonomic nervous system disorder; asthma; spasm;
XX KW respiratory malfunctioning; chronic obstructive pulmonary disease;
XX KW botulinum type A neurotoxin.

XX OS Clostridium botulinum.

XX PN US2003027752-A1.

XX XX 06-FEB-2003.

XX PF 20-JUL-2001; 2001US-00910346.

XX PR 21-JUL-2000; 2000US-00620840.

XX XX (ALLR) ALLERGAN SALES INC.

XX PA Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX PI WPI; 2003-466155/44.

XX DR Novel modified neurotoxin with a structural modification that alters
XX PT biological persistence or activity of the modified neurotoxin relative to
XX PT the unmodified neurotoxin, for treating tremors, bruxism and dysphagia.

XX PS Disclosure; Page 6; 33pp; English.

XX CC

CC The invention describes a modified neurotoxin (I) comprising a structural
CC modification that alters the biological persistence or biological
CC activity of the modified neurotoxin relative to an identical neurotoxin
CC without the structural modification (the modified neurotoxin is
CC structurally different from a naturally existing neurotoxin). (I) which
CC has altered biological persistence, is useful for treating a condition in
CC a mammal, where the neurotoxin does not comprise a leucine-based motif,
CC and the structural modification includes a biological persistence
CC enhancing component which comprises a leucine-based motif, tyrosine-based
CC motif or an amino acid derivative. (I) is useful for treating a condition
CC such as neuromuscular disorder, autonomic disorder or pain, or spasmodic
CC dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia,
CC cervical dystonia, focal hand dystonia, blepharospasm, strabismus,
CC hemifacial spasm, eyelid disorder, neurogenic bladder, cerebral palsy, focal spasticity,
CC tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation,
CC hyperhydrosis, excessive salivation, excessive gastrointestinal
CC secretions, pain from muscle spasms, headache pain, brow furrows and skin
CC wrinkles. (I) is also useful for treating spinal curvature, various forms
CC of inflammatory pains, autonomic nervous system disorders, e.g., an
CC respiratory malfunctioning such as chronic obstructive pulmonary disease,
CC and asthma; pain not associated with a muscular disorder, such as spasm.
CC A unit amount of modified neurotoxin having altered biological activity
CC than natural neurotoxin, is more efficient to reduce exocytosis from a
CC cell than is a unit amount of naturally existing neurotoxin. This is the
CC amino acid sequence of a possible leucine-based motif derived from
CC Botulinum type A neurotoxin

XX SQ Sequence 7 AA;

ABU61532 Length: 7 August 31, 2004 14:39 Type: P Check: 2137
Found using 'seq23' (hayes346.key)

1 FEFYKLL
4 7

10 matches found in sequence:

abu61544 ; Botulinum type toxin A light chain.
(from "bt_ags.pep")

TOIG of: abu61544 check: 6765 from: 1 to: 437

ID ABU61544 standard; peptide; 437 AA.

XX AC ABU61544;

XX DT 11-AUG-2003 (first entry)

XX DE Botulinum type toxin A light chain.

XX KW Neurotoxin; analgesic; antispasmodic; antiinflammatory; cerebral palsy;
XX KW biological persistence; biological persistence enhancing component;
XX KW leucine-based motif; neuromuscular disorder; autonomic disorder; pain;
XX KW spasmodic dysphonia; laryngeal dystonia; oromandibular dysphonia;
XX KW lingual dystonia; cervical dystonia; focal hand dystonia; blepharospasm;
XX KW strabismus; hemifacial spasm; eyelid disorder; focal spasticity;
XX KW tremors; bruxism; anal fissure; achalasia; dysphagia; lacrimation;
XX KW hyperhydrosis; salivation; gastrointestinal secretion; muscle spasm;
XX KW headache pain; brow furrow; skin wrinkle; spinal curvature;
XX KW inflammatory pain; autonomic nervous system disorder; asthma; spasm;
XX KW respiratory malfunctioning; chronic obstructive pulmonary disease;
XX KW botulinum type toxin A light chain.

XX OS Clostridium botulinum.

XX PN US2003027752-A1.

XX XX 06-FEB-2003.

XX PF 20-JUL-2001; 2001US-00910346.

Thu Sep 2 08:56:11 2004

374 KINIVPKVNTIYDGFNLRNTNLAANFNQNTENNMMFTKLNFTGLFFYKLLCVRGI
383
386
ITSK

434

7 matches found in sequence:
abu61545; Botulinum type toxin B Danish I light chain.

TOIG of: abu61545 check: 9222 from: 1 to: 441

ID ABU61545 standard; peptide; 441 AA.

XX AC ABU61545;

XX 11-AUG-2003 (first entry)

XX Botulinum type toxin B Danish I light chain.

XX Neurotoxin; analgesic; antispasmodic; antiinflammatory; cerebral palsy;
XX biological persistence; biological persistence enhancing component;
XX leucine-based motif; neuromuscular disorder; autonomic disorder; pain;
XX spasmodic dysphonia; laryngeal dystonia; oromandibular dysphonia;
XX lingual dystonia; cervical dystonia; focal hand dystonia; blepharospasm;
XX strabismus; hemifacial spasm; eyelid disorder; anismus; limb spasticity; tics;
XX spasmodic colitis; neurogenic bladder; achalasia; dysphagia; lacrimation;
XX tremors; bruxism; anal fissure; gastrointestinal secretion; muscle spasm;
XX hyperhidrosis; salivation; gastric retention; spinal curvature;
XX headache pain; brow furrow; skin wrinkle; asthma; spasm;
XX inflammatory pain; autonomic nervous system disorder; asthma; spasm;
XX respiratory malfunctioning; chronic obstructive pulmonary disease;
XX botulinum type toxin B Danish I light chain.

XX Clostridium botulinum.

XX US2003027752-A1.

XX 06-FEB-2003.

XX 20-JUL-2001; 2001US-00910346.

XX 21-JUL-2000; 2000US-00620840.

XX (ALLR) ALLERGAN SALES INC.

XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX WPI; 2003-466155/44.

XX Novel modified neurotoxin with a structural modification that alters
XX biological persistence or activity of the modified neurotoxin relative to
XX the unmodified neurotoxin, for treating tremors, bruxism and dysphagia.

XX Disclosure; Fig 8; 33pp; English.

XX The invention describes a modified neurotoxin (I) comprising a structural
XX modification that alters the biological persistence or biological
XX activity of the modified neurotoxin relative to an identical neurotoxin
XX without the structural modification (the modified neurotoxin is
XX structurally different from a naturally existing neurotoxin). (I) which
XX has altered biological persistence, is useful for treating a condition in
XX a mammal, where the neurotoxin does not comprise a leucine-based motif,
XX and the structural modification includes a leucine-based motif, an
XX enhancing component which comprises a leucine-based motif, tyrosine-based
XX motif or an amino acid derivative. (I) is useful for treating a condition
XX such as neuromuscular disorder, autonomic disorder or pain, or spasmodic
XX dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia,
XX cervical dystonia, focal hand dystonia, blepharospasm, strabismus,
XX hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, tics,
XX spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics,
XX tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation,

XX 21-JUL-2000; 2000US-00620840.
XX (ALLR) ALLERGAN SALES INC.
XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
XX WPI; 2003-466155/44.

XX Novel modified neurotoxin with a structural modification that alters
XX biological persistence or activity of the modified neurotoxin relative to
XX the unmodified neurotoxin, for treating tremors, bruxism and dysphagia.

XX Disclosure; Fig 3; 33pp; English.

XX The invention describes a modified neurotoxin (I) comprising a structural
XX modification that alters the biological persistence or biological
XX activity of the modified neurotoxin relative to an identical neurotoxin
XX without the structural modification (the modified neurotoxin is
XX structurally different from a naturally existing neurotoxin). (I) which
XX has altered biological persistence, is useful for treating a condition in
XX a mammal, where the neurotoxin does not comprise a leucine-based motif,
XX and the structural modification includes a leucine-based motif, tyrosine-based
XX enhancing component which comprises a leucine-based motif, tyrosine-based
XX motif or an amino acid derivative. (I) is useful for treating a condition
XX such as neuromuscular disorder, autonomic disorder or pain, or spasmodic
XX dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia,
XX cervical dystonia, focal hand dystonia, blepharospasm, strabismus,
XX hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, tics,
XX spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics,
XX tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation,
XX hyperhidrosis, excessive salivation, excessive gastric retention,
XX secretions, pain from muscle spasms, headache pain, brow furrows and skin
XX wrinkles. (I) is also useful for treating spinal curvature, various forms
XX of inflammatory pains, autonomic nervous system disorders, e.g., an
XX respiratory malfunctioning such as chronic obstructive pulmonary disease,
XX and asthma; pain not associated with a muscular disorder, such as spasm.
XX A unit amount of modified neurotoxin having altered biological activity
XX than natural neurotoxin, is more efficient to reduce exocytosis from a
XX cell than is a unit amount of naturally existing neurotoxin. This is the
XX amino acid sequence of a botulinum type toxin A light chain from which a
XX modified neurotoxin is created

XX Sequence 437 AA;

ABU61544 Length: 437 August 31, 2004 14:39 Type: P Check: 6765
Found using 'seq23' (hayes346.key)

1 PFVNKQFNKDPVNGVDIAIKIPNVGQMPVKAFKIHNKIWIPIERTFTNPEEGDLPN
20 23

61 PPEAKQVPVSYYD

134 INVIQPDGYSRBEMLNLIIGPSADIIQFECKSGFGEVLNLTNGYGSTQYIRSPDFTF
184

194 GFRESLEVDNPLLGAGKFAVDPAVTLAHLHAGHRLYGIATNPNRVKNTNAYVEMS
232 249

254 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKKFDIASTLNKAKSIVGTTASLQVMK
286

314 NVFKEKYLSDSTSGKFSVDKLFKDKYKMLTEIYTDNPFVKFLNKRKYLNFDAVF
341 365

CC hyperhydrosis, excessive salivation, excessive gastrointestinal
CC secretions, pain from muscle spasms, headache pain, brow furrows and skin
CC wrinkles. (I) is also useful for treating spinal curvature, various forms
CC of inflammatory pains, autonomic nervous system disorders, e.g., an
CC respiratory malfunctioning such as chronic obstructive pulmonary disease,
CC and asthma; pain not associated with a muscular disorder, such as spasm.
CC A unit amount of modified neurotoxin having altered biological activity
CC than natural neurotoxin, is more efficient to reduce exocytosis from a
CC cell than is a unit amount of naturally existing neurotoxin. This is the
CC amino acid sequence of a botulinum type toxin B Danish I light chain used
CC to determine a consensus sequence for Botulinum toxin
XX
SQ Sequence 441 AA;

ABU61545 Length: 441 August 31, 2004 14:39 Type: P Check: 9222 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNPNNDPIDNNNIIMPEPPFARGTGKRYKAFKITDRWIIPERYTFGYKPEDFN
33 36
34 37

61 KSSGIFNRDVCEYDDPYLNTNDKKNI

...

149 ERKKGIFANLIIFGPGVLNENETIDIGIQNHFASREGFGIMQMFCPEYVSFNNVQE
199

209 NKGASIFNRRGYFSDPALILMHLEIHLVHLGYIKVDLDLPIVPNEKKFFMQSTDAIQAE

269 LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVRLNKLVCISDPNININIYKNKFKDKY
289 328

329 KFVEDSEKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKNLLD
331 349

389 NEIYTIIEGNISDKOMEKRYGQNKAINKQAYEEISKEHLAVYKIQMCKSVK
421

-- Search Statistics --

Times: CPU Total Elapsed
00:00:00.05 00:00:05.00

Number of sequences searched: 309
Number of sequence hits: 169
Number of separate matches: 1522
Number of sequence hits saved: 0


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> O <
> | O IntelliGenetics
> O <

Quest - Quick User-directed Expression Search Tool
Release 5.4

-- Outline of search "seq23sp" --

Selected search type is key against sequence data banks or files.
Selected scope is Sequence. "hayes346.key":
Selected sequence key from "seq23 AA preliminary pattern
1 seq23 (AA) ID: seq23 AA preliminary pattern
2 followed by
2 Y
2 any character
2 any character
2 1 or i or m or a or f or w or v or y

Selected files:
File : bt_sp.pep

-- Output Parameters --

Format Options:
Nucleic acid code matching Exact Indirect file
Find non-matching hits only No Sequence or key file
Report key used Yes List of hits
Note position of hit Yes Hit display
Display full annotations Yes Name and annotations
Sequence context 50

Run mode
Time to start comparison now
Notify at end of run No

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2 matches found in sequence:
arc3cbcp ; Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C3
(from "bt_sp.pep")
TOIG of: arc3_cbcp check: 5480 from: 1 to: 244

ID ARC3 CBCP STANDARD; PRT; 244 AA.
AC Q00501;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 30-MAY-2000 (Rel. 39, Last annotation update)
DE Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C3).
OS Clostridium botulinum C bacteriophage.
OC Viruses.
OX NCBI_TaxID=12448;
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 41-232.
RC STRAIN=003-9;
RX MEDLINE=92011724; PubMed=1918048;
RA Nemoto Y., Namba T., Kozaki S., Narumiya S.;
RT "Purification and characterization of ADP-ribosyltransferases
RT (exoenzyme C3) of Clostridium botulinum type C and D strains.";
RL J. Bacteriol. 173:6025-6029(1991).
CC !- FUNCTION: ADP-RIBOSYLATES EUKARYOTIC RHO AND RAC PROTEINS ON

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1 match found in sequence:
arc3clolm ; Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C
(from "bt_sp.pep")
TOIG of: arc3_clolm check: 3333 from: 1 to: 250

ID ARC3 CLOLM STANDARD; PRT; 250 AA.
AC Q46134;
DT 01-NOV-1997 (Rel. 35, Created)
DT 01-NOV-1997 (Rel. 35, Last sequence update)
DT 01-NOV-1997 (Rel. 35, Last annotation update)
DE Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C3).
GN C3.
OS Clostridium limosum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1536;
RN [1]
RP SEQUENCE FROM N.A., AND MUTAGENESIS.
RC STRAIN=2;
RX MEDLINE=96134846; PubMed=8555186;
RA Boehrmer J., Jung M., Sehr P., Fritz G., Popoff M.R., Just I.,
RA "Active site mutation of the C3-like ADP-ribosyltransferase from
RT Clostridium limosum -- analysis of glutamic acid 174.";
RL Biochemistry 35:282-289(1996).
RN [2]
RP PARTIAL SEQUENCE.

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RX MEDLINE=92268060; PubMed=1587816;
RA Just I., Mohr C., Schallehn G., Menard L., Didsbury J.R.,
RA Vanderkerckhove J., van Damme J., Aktories K.;
RT "Purification and characterization of an ADP-ribosyltransferase
RT produced by Clostridium limosum.";
RL J. Biol. Chem. 267:10274-10280(1992).
RN [3]
RN PARTIAL SEQUENCE.
RP MEDLINE=94043108; PubMed=8226842;
RX Jung M., Just I., van Damme J., Vanderkerckhove J., Aktories K.;
RA "NAD-binding site of the C3-like ADP-ribosyltransferase from
RT Clostridium limosum.";
RL J. Biol. Chem. 268:12315-23218(1993).
CC CC -1- FUNCTION: ADP-RIBOSYLATES EUKARYOTIC RHO AND RAC PROTEINS ON
CC AN ASPARAGINE RESIDUE.
CC CC -1- SUBUNIT: Monomer (By similarity).
CC CC -1- SUBCELLULAR LOCATION: Secreted.
CC CC -1- SIMILARITY: TO C.BOTULINUM D AND C PHAGES EXOENZYME C3, AND TO
CC S.AUREUS EDIN.
CC -----
CC This SWISS-PROT entry is copyright. It is produced through a collaboration
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CC entities requires a license agreement (See http://www.isb-sib.ch/announce/
CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL: X87215; CAA60674.1; ..
CC InterPro: IPR003540; Binary toxinA.
CC Pfam: PF03496; Binary_toxA_1
CC NAD; Transferase; Glycosyltransferase; Signal.
CC SIGNAL 1 45 POTENTIAL.
CC CHAIN 46 250 MONO-ADP-RIBOSYLTRANSFERASE C3.
CC ACT SITE 219 219 PROBABLE.
CC MUTAGEN 219 219 E->D.Q: MAJOR DECREASE IN KCAT, BUT NO
CC MAJOR CHANGES IN KM.
CC SEQUENCE 250 AA; 27852 MW; 7F351ADD0CE8DD8D CRC64;
ARC3 CLOIM Length: 250 September 1, 2004 07:06 Type: P Check: 3333
Found using 'seq23' (hayes346.key)
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125 TPENILFRGDDEGYLGPDPFENTILNRDGTINKAVPEQVKLRFGKDKRKEYGVISTLVN
175
185 GSAPAGRIITKFKVLDGSKAGVIEPISTFKGQLEVLPRSSVY
...
30 matches found in sequence:
bxa1clobo; Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
(TOIG of 'bxa1_sp.pep')
TOIG from: bxa1_clobo check: 5280 from: 1 to: 1295
ID BXA1_CLOBO STANDARD; PRT; 1295 AA.
AC P10845; P01561; P18639;
DT 01-JUL-1989 (Rel. 11, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
DE (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
DE chain; Botulinum neurotoxin A, heavy-chain].
GN BOTA OR BNA OR ATX.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.

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RC STRAIN=NCTC 2916;
RX MEDLINE=90235864; PubMed=2185020;
RA Thompson D.E., Brehm J.K., Oultram J.D., Swinfield T.-J.,
RA Shone C.C., Atkinson T., Melling J., Minton N.P.;
RT "The complete amino acid sequence of the Clostridium botulinum type A
RT neurotoxin, deduced by nucleotide sequence analysis of the encoding
RT gene.";
RL Eur. J. Biochem. 189:73-81(1990).
RN [2]
RN SEQUENCE FROM N.A.
RP STRAIN=62A;
RX MEDLINE=90264400; PubMed=2160960;
RA Binz B., Kuazono H., Wille M., Frevent J., Wernars K., Niewann H.;
RT "The complete sequence of botulinum neurotoxin type A and comparison
RT with other clostridial neurotoxins.";
RL J. Biol. Chem. 265:9153-9158(1990).
RN [3]
RN SEQUENCE OF 1-65 FROM N.A.
RP STRAIN=62A;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B, and F: evidence of chimeric sequences in the
RT gene encoding the nontoxic nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
RN [4]
RN SEQUENCE OF 1-34 FROM N.A.
RP STRAIN=Hall;
RX MEDLINE=89350959; PubMed=2669749;
RA Betley M.J., Somers E., Dasgupta B.R.;
RT "Characterization of botulinum type A neurotoxin gene: delineation of
RT the N-terminal encoding region.";
RL Biochem. Biophys. Res. Commun. 162:1388-1395(1989).
RN [5]
RN SEQUENCE OF 1-18 FROM N.A.
RP STRAIN=Type A NIH;
RX MEDLINE=96096783; PubMed=8521962;
RA Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
RT "Molecular characterization of two forms of nontoxic-nonhemagglutinin
RT components of Clostridium botulinum type A progenitor toxins.";
RL FEBS Lett. 376:41-44(1995).
RN [6]
RN SEQUENCE OF 1-16.
RP MEDLINE=84178501; PubMed=6370252;
RA Schmidt J.J., Sartymoorthy V., Dasgupta B.R.;
RT "Partial amino acid sequence of the heavy and light chains of
RT botulinum neurotoxin type A.";
RL Biochem. Biophys. Res. Commun. 119:900-904(1984).
RN [7]
RN SEQUENCE OF 1-46.
RP Dasgupta B.R., Foley J., Niece R.;
RT "Partial sequence of the light chain of botulinum neurotoxin type A.";
RL Biochemistry 26:4162-4162(1987).
RN [8]
RN SEQUENCE OF 1-5 AND 444-456.
RP MEDLINE=91120847; PubMed=2126206;
RX Dasgupta B.R., Dekleva M.L.;
RT "Botulinum neurotoxin type A: sequence of amino acids at the
RT N-terminus and around the nicking site.";
RL Biochimie 72:661-664(1990).
RN [9]
RN SEQUENCE OF 448-464 AND 872-895.
RP MEDLINE=89024662; PubMed=3178218;
RX Sathymoorthy V., Dasgupta B.R., Foley J., Niece R.L.;
RA "Botulinum neurotoxin type A: cleavage of the heavy chain into two
RT halves and their partial sequences.";
RL Arch. Biochem. Biophys. 266:142-151(1988).
RN [10]
RN SEQUENCE OF 448-482.
RP MEDLINE=85285016; PubMed=3896784;
RX Shone C.C., Hambleton P., Melling J.;
RA "Inactivation of Clostridium botulinum type A neurotoxin by trypsin
RT

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and purification of two tryptic fragments. Proteolytic action near the COOH-terminus of the heavy subunit destroys toxin-binding activity.";
 Eur. J. Biochem. 151:75-82(1985).
 [11]
 RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=94063091; PubMed=8243676;
 RA Schiavo G., Santucci A., Dasgupta B.R., Mehta P.P., Jontes J., Benfenati F., Wilson M.C., Montecucco C.;
 RT "Botulinum neurotoxins serotypes A and E cleave SNAP-25 at distinct COOH-terminal peptide bonds.";
 RL FEBS Lett. 335:99-103(1993).
 RN [12]

RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=94124495; PubMed=8294407;
 RA Binz T., Blaszi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C., Jahn R., Niemann H.;
 RT "Proteolysis of SNAP-25 by types E and A botulinum neurotoxins.";
 RL J. Biol. Chem. 269:1617-1620(1994).
 RN [13]
 RP MUTAGENESIS OF GLU-261; PHE-265 AND TYR-365.
 RX MEDLINE=21556941; PubMed=11700044;
 RA Rigoni M., Gaccin P., Johnson E.A., Montecucco C., Rossetto O.;
 RT "Site-directed mutagenesis identifies active-site residues of the light chain of botulinum neurotoxin type a.";
 RL Biochem. Biophys. Res. Commun. 288:1231-1237(2001).
 RN [14]

RP X-RAY CRYSTALLOGRAPHY (3.3 ANGSTROMS).
 RX MEDLINE=98455071; PubMed=9783750;
 RA Lacy D.B., Tepp W., Cohen A.C., Dasgupta B.R., Stevens R.C.;
 RT "Crystal structure of botulinum neurotoxin type A and implications for toxicity.";
 RL Nat. Struct. Biol. 5:898-902(1998).

CC -!- FUNCTION: Inhibits acetylcholine release. The botulinum toxin binds with high affinity to peripheral neuronal presynaptic membrane, is then internalized by receptor-mediated endocytosis. The C-terminus of the heavy chain (H) is responsible for the adherence of the toxin to the cell surface while the N-terminus mediates transport of the light chain from the endocytic vesicle to the cytosol. After translocation, the light chain (L) hydrolyzes the 197-Gln-|-Arg-198 bond in SNAP-25, thereby blocking neurotransmitter release. Inhibition of acetylcholine release results in flaccid paralysis, with frequent heart or respiratory failure.

CC -!- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No detected action on small molecule substrates.
 CC -!- COFACTOR: Binds 1 zinc ion per subunit.
 CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a heavy chain (H).

CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- PHARMACEUTICAL: Available under the name BOTOX (Allergan) for the treatment of strabismus and blepharospasm associated with dystonia and cervical dystonia. Also used for the treatment of hemifacial spasm and a number of other neurological disorders characterized by abnormal muscle contraction.

CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
 CC -!- SIMILARITY: Belongs to peptidase family M27.

CC -!- DATABASE: NAME=BOTOX product information web site;
 WWW="http://www.botox.com/index.jsp?hp&productinfo".

CC -!- DATABASE: NAME=Protein Spotlight;
 NOTE=Issue 19 of February 2002;
 WWW="http://www.expasy.org/spotlight/articles/sptl019.html".

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DR EMBL; X52066; CAA36289.1; --
 DR EMBL; M30196; AAA23262.1; --
 DR EMBL; X92973; CAA63551.1; --
 DR EMBL; D67030; BAA11051.1; --
 DR EMBL; M27892; AAA23269.1; --
 DR PIR; A35294; BTCLAB.
 DR PDB; 3BTA; 01-OCT-99.
 DR MEROPS; M27.002; --
 DR InterPro; IPR008985; ConA like lec.gl.
 DR InterPro; IPR002160; Kunitz legume.
 DR InterPro; IPR006025; Pept_M_Zn_BS.
 DR InterPro; IPR000395; Peptidase M27.
 DR Pfam; PF01742; Peptidase M27; 1.
 DR PRINTS; PR00760; BONTOKILYSIN.
 DR ProDom; PD001963; Bontokilysin; 1.
 DR PROSITE; PS00142; ZINC_PROTEASE; 1.
 KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc;
 KW Pharmaceutical; 3D-structure.
 FT INIT_MET 0
 FT CHAIN 1 447
 FT CHAIN 448 1295
 FT METAL 222 222
 FT ACT_SITE 223 223
 FT METAL 226 226
 FT METAL 261 261
 FT DISULFID 429 453
 FT DISULFID 1234 1279
 FT TRANSMEM 626 646
 FT TRANSMEM 655 675
 FT VARIANT 26 26
 FT MUTAGEN 261 261
 FT MUTAGEN 265 265
 FT MUTAGEN 365 365
 FT CONFLICT 1 1
 FT CONFLICT 479 479
 FT CONFLICT 875 875
 FT CONFLICT 891 891
 SQ SEQUENCE 1295 AA; 149322 MW; 858342F754862579 CRC64;
 BXAL CLOBO Length: 1295 September 1, 2004 07:06 Type: P Check: 5280
 Found using 'seq23' (hayes346.key)

1 PFVNKQFNKDPVNGVDIAYIKIPNVGQMPVKAFKHKNKIWIIPEDTFTNPEGLNP
 20 23

61 PPEAKQVPVSYYD

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134 INVIPDGSVRSEELNLVIGPSADIIQFECKSFGEVNLNTRNGYGSTQYIRFSPDFTF
 184

194 GFESLEVDNPLLGAGKEATDPAVTLAHELHAGHRLYGIAINPNRVKVNNTNAYEMS
 232

254 GLEVSFEELRTFGHDAKFDLSIQENEFELYYNKFQKDIATSLINKAKSIGVTASLQYMK
 286

314 NVFKEKLLSEDTSCFKSVDKLKFVKLVMLEIYTEDNFVFKFKVLNKRKTLNFKDAVF
 341

374 KINIVPKNYNTIYDGFNLNRLNTLNAANFNQVTEINNMNFTKLNFTGLFVFKLVCVRGI
 383 386 425

| | | | | |
|---|---|------|----|--|
| 434 | ITSKTSKSLDKYKALNDLCIKVNNWDLFFSPSEDNFTDNLNKGEEITSDTNTIEAAEENI | 445 | OS | Clostridium botulinum. |
| 494 | SLDLIOQYLTFFDNEPENISLSSDIIGQLMLPNIERFPGKKYELDKYTMFHYL | 502 | OC | Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae; |
| 554 | RAQEFHGKSRIALTSVNEALLNPSRVYTFPSSDYVKVKNKATEAAMFLGWVBQLVYDF | 555 | OC | Clostridium. |
| 614 | TDETSEVSTTDKIADITIIIPY | | OX | NCBI_TaxID=1491; |
| ... | | | RN | [1] |
| 659 | GAVILLEFIEPIALPVLGTFAVSYIANKVLTVQTDNALSKRNKWDVYKYIVTNWLA | 709 | RP | SEQUENCE FROM N.A. |
| 719 | KVNTQIDLRKKMKEALENQAEATKALINYQVNOYTEBEKNNINFNIDDLSSKLNESINK | 750 | RC | STRAIN=Kyoto-F; |
| 779 | AMININKFNQCSVSYLMSMIPYG | | RX | MEDLINE=94143603; PubMed=8310180; |
| ... | | | CC | Willems A., East A.K., Lawson P.A., Collins M.D.; |
| 883 | ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVLKNAIVNMSYENFST | 933 | CC | "sequence of the gene coding for the neurotoxin of Clostridium |
| 943 | SFWIRIPKVFNSISLNNEVTIINCMMENSGKVSILNYGELIWTLODTQBIKORVVVKYSQ | 979 | CC | botulinum type A associated with infant botulism: comparison with |
| 1003 | MINISDYINRWIFVTITNRLNLSKIYINGRLIDQKPISNLGNHHSNNIMFKLDCRDT | 1000 | CC | other clostridial neurotoxins."; |
| 1063 | HYIWKYFNFDKELNEKEIKDLYDNQNSGILKDFWGDYIQYDKPYVYMLNDYDNKV | 1103 | CC | Res. Microbiol. 144:547-556(1993). |
| 1123 | DVNVGIRCYMYLKGRGVSMTTNIYLSNLSYRGTKFIKKVASGNKDNIVRNNDVYIN | 1180 | CC | [2] |
| 1183 | VVVKNEYRLATNASQAGVEKILSALSIIDPVGNLISQVVMVMSKNDQGITNKCROMLQDNN | 1190 | CC | SEQUENCE OF 1-65 FROM N.A. |
| 1243 | G | | CC | STRAIN=Kyoto-F; |
| ... | | | CC | MEDLINE=97016817; PubMed=8863443; |
| 29 matches found in sequence: | | | CC | East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.; |
| bxazc10bo ; Botulinum neurotoxin type A precursor (EC 3.4.24.69) (Bont/A) | | | CC | "Organization and phylogenetic interrelationships of genes encoding |
| (from "bt.sp.pep") | | | CC | components of the botulinum toxin complex in proteolytic Clostridium |
| TOIG of: bxaz_c10bo check: 706 from: 1 to: 1295 | | | CC | botulinum types A, B, and F: evidence of chimeric sequences in the |
| ID BXA2_C10BO STANDARD; PRT; 1295 AA. | | | CC | gene encoding the nontoxic nonhemagglutinin component."; |
| AC Q45894; P77780; | | | CC | Int. J. Syst. Bacteriol. 46:1105-1112(1996). |
| DT 28-FEB-2003 (Rel. 41, Created) | | | CC | -!- FUNCTION: Inhibits acetylcholine release. The botulinum toxin |
| DT 28-FEB-2003 (Rel. 41, Last sequence update) | | | CC | binds with high affinity to peripheral neuronal presynaptic |
| DT 28-FEB-2003 (Rel. 41, Last annotation update) | | | CC | membrane, is then internalized by receptor-mediated endocytosis. |
| DE Botulinum neurotoxin type A precursor (EC 3.4.24.69) (Bont/A) | | | CC | The C-terminus of the heavy chain (H) is responsible for the |
| DE (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light- | | | CC | adherence of the toxin to the cell surface while the N-terminus |
| DE chain; Botulinum neurotoxin A, heavy-chain]. | | | CC | mediates transport of the light chain from the endocytic vesicle |
| GN BOTA OR BNA OR ATX. | | | CC | to the cytosol. After translocation, the light chain (L) |


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FT DISULFID 1234 1279 BY SIMILARITY.
FT TRANSMEM 626 646 POTENTIAL.
FT TRANSMEM 655 675 POTENTIAL.
SQ SEQUENCE 1295 AA; 149279 MW; 5DA04A13D98D6372 CRC64;
BXA2 CLOBO Length: 1295 September 1, 2004 07:06 Type: P Check: 706
Found using 'seq23' (hayes346.key)

1 PFVNKQFNKDPVNGVDIAYIKIPNAGQMPVKAFLHINKIWIPIERDTFTNPERGDLNP
20 23
61 PPEAKQVPVSYD
...
134 INVLPDGSYRSEELNLVIGPSADIIQFECKSFQHDVLNLTNRNGYSTQYIRFSPDFTF
184
194 GFERSLEVDTNPLLGAGKFAFDPAVTLAHELIIHAERHLYGIAINPNRVFKVNTNAYEYMS
232
254 GLEVSFELRTFGHDAKFIDSLQENBFRLYYKFKDQVASTLNKAKSIIGTTASLQVMK
286
314 NVFKEKYLSEDTSKGFSVDKLFKDKLYKMLTEIYTDNFVNFFKVINRKYTNLFDRKAVF
341
374 RINIVPDENYTIKDGPNLKGANLSTNFNGQNTNINSRNFTLKNFTGLFFYKLLCVRGI
425
434 IPFKTKSLDEGYKALNDLCIKVNNWDLFFSPSEDNFTNLDKVEITADTNTAEAEENI
445
494 SLDLIQYVLTDFDNEPENISINENSSDIIGLEPNPIERFPNGKKYBLDKYTMFHYL
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554 RAQEFPHGDSRIILTNSABEALLKPNVAYTFFSSKYVKKINKAVEAFMFLNWAELVYDF
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614 TDENETVTMDKIADIITIIVPY
...
700 KRNEKWDEVKYVTVNLAKVNTQIDLIREKMKALENQAEATKALINYQNYTEBEKN
750
760 NINFNIDLLSSKLNESINSAMININKFLDQCSVSLNMGMIPIYA
...
855 YVDNKKLLSTFTTEYIKNIVNTSILSIVYKKDDLIDLSRYGAKINIGDRVYVDSIDKNQIK
905
915 LINLESSTIEVLKNAIVNSMYENFSTFWIKIPKFSKINLNNEYTLINCINNCGWK
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975 VSLNAGEIILWTLDQNKQIQRVVFYKYSQMWNSIDVINRWIFVTITNRLTKSKIYINGEL
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1035 IDQKPIISNLGNIHASNKIMFKLDGCRDPRRYIMIKYENLFDKELNEKEIKDLYDSQNSG
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1095 ILKDFWGNLYQDKPYMYMLNLFDPNKYVDVNNIGIRGYMYLKGPRGSVVVTNIIYNSTLY
1103 1110 1121 1132
1155 EGTKFIKKYASGNEEDNIVRNDRVYINVVVNKKEYRLATNASQAGVEKILSALEIPDVG
1180 1190
1215 NLSQVVVMKSKDDQIRNCKRMNLQDNNNDIGFIFGLHYDNIKIAKLIVASNWNVRQVGKAS
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1275 RTFGCSWEFIPVDDGWGESSL
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26 matches found in sequence:
bxbclobo ; Botulinum neurotoxin type B precursor (EC 3.4.24.69) (BoNT/B)
(from "bt sp pep")

TOIG of: bxb_clobo check: 5052 from: 1 to: 1290

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ID BXB_CLOBO STANDARD; PRT; 1290 AA.
AC P10844; P10843;
DT 01-JUL-1989 (Rel. 11, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Botulinum neurotoxin type B precursor (EC 3.4.24.69) (BoNT/B)
DE Bontoxilysin B).
GN BOTB.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=92384550; PubMed=1514783;
RA Whelan S.M., Elmore M.J., Bodsworth N.J., Brehm J.K., Atkinson T.,
RA Minton N.P.;
RT "Molecular cloning of the Clostridium botulinum structural gene
RT encoding the type B neurotoxin and determination of its entire
RT nucleotide sequence.";
RL Appl. Environ. Microbiol. 58:2345-2354(1992).
RN [2]
RP SEQUENCE OF 35-245 FROM N.A.
RC STRAIN=NCTC 7273;
RA Szabo E.A., Pemberton J.M., Desmarchelier P.M.;
RL Submitted (APR-1992) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE OF 633-993 FROM N.A.
RC STRAIN=NCTC 7273;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulinum neurotoxin gene and
RT specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
RN [4]
RP SEQUENCE OF 1-44 AND 441-466.
RC STRAIN=657;
RX MEDLINE=89000987; PubMed=3139097;
RA Dasgupta B.R., Datta A.;
RT "Botulinum neurotoxin type B (strain 657): partial sequence and
RT similarity with tetanus toxin.";
RL Biochimie 70:811-817(1988).
RN [5]
RP SEQUENCE OF 1-16 AND 441-458.
RC STRAIN=OKRA;
RX MEDLINE=85197963; PubMed=3888113;
RA Schmidt J.J., Sathiamoorthy V., Dasgupta B.R.;
RT "Partial amino acid sequences of botulinum neurotoxins types B and
```

RT E."; Biochem. Biophys. 238:544-548(1985).
RL Arch. [6]
RN IDENTIFICATION AS ZINC-PROTEASE.
RP MEDLINE=93054694; PubMed=1429690;
RX Schiavo G., Rossetto O., Santucci A., Dasgupta B.R., Montecucco C.;
RA "Botulinum neurotoxins are zinc proteins.";
RT J. Biol. Chem. 267:23479-23483(1992).
RN [7]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=93063293; PubMed=1331807;
RA Schiavo G., Benfenati F., Poulain B., Rossetto O., de Laureto P.P.,
RD Dasgupta B.R., Montecucco C.;
RT "Tetanus and botulinum-B neurotoxins block neurotransmitter release
by proteolytic cleavage of synaptobrevin.";
RN Nature 359:832-835(1992).
CC -1- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE THAT CLEAVES THE 76-GLN-|-PHE-77 BOND OF
CC SYNAPTOSOMAL-2.
CC -1- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -1- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -1- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel
CC formation and toxin binding, respectively.
CC -1- SUBCELLULAR LOCATION: Secreted.
CC -1- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -1- SIMILARITY: Belongs to peptidase family M27.

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CC or send an email to license@isb-sib.ch).

DR EMBL; M81186; AAA23211.1; -;
DR EMBL; Z11934; CAA77991.1; -;
DR EMBL; X70817; CAA50148.1; -;
DR PIR; A48940; A48940.
DR PDB; 1EFW; 01-NOV-00.
DR PDB; 1F31; 01-NOV-00.
DR PDB; 1F82; 16-AUG-00.
DR PDB; 1F83; 16-AUG-00.
DR PDB; 1FOH; 06-DEC-00.
DR PDB; 1G9A; 13-NOV-02.
DR PDB; 1G9B; 13-NOV-02.
DR PDB; 1G9C; 13-NOV-02.
DR PDB; 1G9D; 13-NOV-02.
DR PDB; 111E; 21-NOV-01.
DR MEROPS; M27.002; -;
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PD00760; BONTOTOXILYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
DR Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc;
KW 3D-structure.
KW INIT MET 0
FT CHAIN 1 440 BOTULINUM NEUROTOXIN B, LIGHT-CHAIN.
FT CHAIN 441 1290 BOTULINUM NEUROTOXIN B, HEAVY-CHAIN.
FT METAL 229 229 ZINC (CATALYTIC) (BY SIMILARITY).

FT ACT SITE 230 230 BY SIMILARITY.
FT METAL 233 233 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 436 445 INTERCHAIN (PROBABLE).
FT CONFLICT 29 29 T -> M (IN REF. 4).
FT CONFLICT 217 217 R -> G (IN REF. 2).
FT CONFLICT 224 224 A -> S (IN REF. 2).
FT CONFLICT 463 463 S -> R (IN REF. 4).
SQ SEQUENCE 1290 AA; 150670 MW; D21746B2C024DF43 CRC64;
BXB_CLOBO Length: 1290 September 1, 2004 07:06 Type: P Check: 5052
Found using 'seq23' (hayes346.key);
1 PVTINNPNYNDPINDNNIIMWEPFARGTGRTYKAFKITDRWIIPRYTGYKPEDFNK
32 35
33 36
61 SSGIFNRDVCCEYDPDYLTNDKKN
...
148 ERKKGIFANLIIFGPGVNLNETIDIGIQNHPSRREGFGGIMQMCKPCPVSVFNNVOE
198
208 NKGASIFNRGYSPPALLMLHGLHVLHGLYGIKVDLDPIVPNEKKFFMOSTDAIQABE
268 LYTFGGQDPSIITSTDKSIYDKVLQNGRIVDRNLKVLVCISDPNININIVKKNFKDKY
288
328 KEVDESECKYSIDVESPDKLYKLMFGFTETNAENYKIKTRASYFSDSLPVPVKIKNLLD
330 348
388 NEIYTIIEGFNISDKMEKEYRGQNKANKQAEIISKEHLAVYKIOMCKSVKAFGICID
420
448 VDNEDLFTIADKNFSDDLKSKNERIE
...
519 VYEQKPAIKKIFTDENTIFQYLYSQTFLDIRDISUTSSFDALLFNKVSFFSMDYIK
569
579 TANKVVEAGLFAGWKQIVNDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF
622
639 ENAFETAGASILLEFIPELLIPVVGAFLLSEYIDNKNKIKTIDNALTKRNEKWSMYGL
696
699 IVAOWLSTVNTQPTTIKEGMYKALNYQAQALEIHKRYNIYSEKESKNINIDFNDSK
719 737
759 LNEGINOADINNNFNGSVSYLMKKMPLA
...
837 FDLISYNTDILLIEMFNKYNSEILNNILNRYKDNLLDLSGKGAKVEYDGVDELKDN
887
897 QFKLTSSANSKIRVTQNNIIFNSVFLDFSFWIRIPKYKNDGIONYIHNEYITINCMK
949
957 NNSGKISIRGNRIIWLIDINGKTSVFPEYNIREDISEYINRWF

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...
1007  TNNLNNAKIYINGKLESNTDIDKIDREVIANGIIFKLDGDIIDRTQFIWMKYFSIFNTELS
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      1057
1067  QSNTEERYKIQSYSEVYLKDFGNGPLMYNKBYMFNAGNKSYIKLKKDSPVGEILTRSKY
      |---|
      1097
1127  NQNSKYINRDLYIGEKFIIRKKSNSQSIINDIVRKEDYLYLDFNQLNQWRYVYTKYFK
      |---|
      1132
      1135
      1165
      1167
1187  KEEKFLAPISDSDEFYNTIQIKEYDEQTYSCQLLFKKDEESTDEIGLIGHRFVESG
      |---|
      1204
1247  IVPEYKDYFCISKWYLKVKRKYFNKLGCNWNQFIPKDEGWTE
      |---|
      1252
      1255

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30 matches found in sequence:
bxciclobo ; Botulinum neurotoxin type C1 precursor (EC 3.4.24.69) (BoNT/C1)
(from "bt sp.pep")
TOIG of: bxc1_clobo check: 7991 from: 1 to: 1290

ID  BXC1_CLOBO  STANDARD;  PRT;  1290 AA.
AC  Fl640;
DT  01-NOV-1990 (Rel. 16, Created)
DT  01-NOV-1990 (Rel. 16, Last sequence update)
DT  28-FEB-2003 (Rel. 41, Last annotation update)
DE  Botulinum neurotoxin type C1 precursor (EC 3.4.24.69) (BoNT/C1)
DE  (Bontoxilysin Cl).
OS  Clostridium botulinum.
OC  Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC  Clostridium.
OX  NCBI_TaxID=1491;
RN  [1]_TaxID=1491;
RP  SEQUENCE FROM N.A.
RX  MEDLINE=90370487; PubMed=2204031;
RA  Hauser D., Eklund M.W., Kurazona H., Binz T., Niemann H., Gill D.M.,
RA  Boquet P., Popoff M.R.;
RT  "Nucleotide sequence of Clostridium botulinum C1 neurotoxin.";
RL  Nucleic Acids Res. 18:4924-4924(1990).
RN  [2]
RP  SEQUENCE FROM N.A.
RC  STRAIN=Type C Stockholm / C-ST;
RX  MEDLINE=91024998; PubMed=2222445;
RA  Kimura K., Fujii N., Tsuzuki K., Murakami T., Indoh T.,
RA  Yokosawa N., Takeshi K., Syuto B., Oguma K.;
RT  "The complete nucleotide sequence of the gene coding for botulinum
RT  type C1 toxin in the C-8r phage genome.";
RL  Biochem. Biophys. Res. Commun. 171:1304-1311(1990).
RN  [3]
RP  SEQUENCE OF 2-25.
RC  STRAIN=Type C Stockholm / C-ST;
RX  MEDLINE=88153072; PubMed=2450068;
RA  Tsuzuki K., Yokosawa N., Syuto B., Ohishi I., Fujii N., Kimura K.,
RA  Oguma K.;
RT  "Establishment of a monoclonal antibody recognizing an antigenic site
RT  common to Clostridium botulinum type B, Cl, D, and E toxins and
RT  tetanus toxin.";
RL  Infect. Immun. 56:898-902(1988).
RN  [4]
RP  IDENTIFICATION OF SUBSTRATE.
RX  MEDLINE=94038966; PubMed=7901002;

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RA  Blasi J., Chapman E.R., Yamasaki S., Binz T., Niemann H., Jahn R.;
RT  "Botulinum neurotoxin C1 blocks neurotransmitter release by means of
RT  cleaving HPC-1/syntaxin.";
RL  EMBO J. 12:4821-4828(1993).
CC  -1- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC  RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC  AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC  WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC  INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC  ENDOPEPTIDASE THAT CLEAVES SYNTAXIN.
CC  -1- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC  neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC  detected action on small molecule substrates.
CC  -1- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC  -1- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC  heavy chain (H). The light chain has the pharmacological activity,
CC  while the N- and C-terminal of the heavy chain mediate channel
CC  formation and toxin binding, respectively.
CC  -1- SUBCELLULAR LOCATION: Secreted.
CC  -1- MISCELLANEOUS: There are seven antigenically distinct forms of
CC  botulinum neurotoxin: Types A, B, Cl, D, E, F, and G.
CC  -1- MISCELLANEOUS: BOTULINUM TYPE C1 NEUROTOXIN IS SYNTHESIZED BY C
CC  STRAIN OF CLOSTRIDIUM BOTULINUM WHICH CARRY THE APPROPRIATE
CC  BACTERIOPHAGE.
CC  -1- SIMILARITY: Belongs to peptidase family M27.
CC  -----
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CC  or send an email to license@isb-sib.ch).
CC  -----
DR  EMBL; X66433; CAA47060.1; -
DR  EMBL; X72793; CAA51313.1; -
DR  EMBL; X53751; CAA37780.1; -
DR  EMBL; D90210; BAA14235.1; -
DR  EMBL; X62389; CAA44263.1; -
DR  HSSP; P10845; 3BTA.
DR  MEROPS; M27.002; -.
DR  InterPro; IPR008985; ConA like lec_gl.
DR  InterPro; IPR002160; Kunitz legume.
DR  InterPro; IPR006025; Pept M Zn BS.
DR  InterPro; IPR000395; Peptidase M27.
DR  Pfam; PF01742; Peptidase M27; 1.
DR  PRINTS; PR00760; BONTOXILYSIN.
DR  ProDom; PD001963; Bontoxilysin; 1.
DR  PROSITE; PS00142; ZINC_PROTEASE; 1.
KW  Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT  INIT MET 0 0
FT  CHAIN 1 448 BOTULINUM NEUROTOXIN C1, LIGHT-CHAIN.
FT  CHAIN 449 1290 BOTULINUM NEUROTOXIN C1, HEAVY-CHAIN.
FT  METAL 228 228 ZINC (CATALYTIC) (BY SIMILARITY).
FT  ACT_SITE 229 229 BY SIMILARITY.
FT  METAL 232 232 ZINC (CATALYTIC) (BY SIMILARITY).
FT  DISULFID 436 452 INTERCHAIN (PROBABLE).
FT  CONFLICT 84 84 P -> T (IN REF. 2).
SQ  SEQUENCE 1290 AA; 148734 MW; 71FBE379F97129E8 CRC64;

BXC1_CLOBO Length: 1290 September 1, 2004 07:06 Type: P Check: 7991
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...
151  INPSVIITGPENIIDPTSTPKLTNNTPFAAQEGFALSIISIPRFLMTYSNATNDVGE
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211  GRFSKSEFCMDPILIMHNLNHNMLNGLIAPNDQTISSVTSNIFYSQYNVKLEYAEIY
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      238
      257
      266

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271 AFGPTIDILPKSARKYFEKALDYIESIAKRLNSITTANPSSFNKYGVEKQKILRKY 329
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296
331 FVYESSGEVTVNRNKFVELYNELTQIFTEFNAYAKIYVNVQNRKIYLSNVYTPVTANILDDN 379
    |---|
350
391 VYDIQGNFIPKSNLNLVLFMGQNLNRNPALRKVPENMLYLF
    |---|
296
465 IGDLSVKTDIFLEKIDINEETEVIYYPDNVSDQVILSKNTSEHGQLDLXPSDSRSEI 515
    |---|
546
525 LPGAQVFDYDNRQNDYLSYVLESQKLSNDNVEDEFTFRSIEALDNSAKVYTFPTL 578
    |---|
546
585 ANKVNAGVQGLFLMWANDVVEDEFTTILNRKDTLDKIDSVSAILIYGPALNISVVRG
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676
645 NFTEAFVAVGTVILLEAPPEFTIPALGAFVIYSKVQERNEIITKIDNCLQRIKRWKDSY 704
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724
705 EMMGTWLSRIITQFNISQYMSLNVQAGAIKAKIDLEKYSKSGSKENIKSQVENLK 745
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724
765 NSLDVKISEAMNNINKFIRECSVYLFKMLPKV
    |---|
955
880 NTLVDTSGYNAEVSEGDVQLNPIPPDFKLGSSGEDRGKVIIVTQENINVMYSFISI 930
    |---|
955
940 SFWRINKWVNLPGYTIIDSVKNNSGWSIGIISFLVTLKQNEDESRQSNFSYDISNN 955
    |---|
1003
1000 APGVNKNFPVTVTNMGMNKIYINGKLIIDTIKVKELTGINFSTKITTEINKIPTGLIT 1003
    |---|
1073
1060 SDSNDNNWIRDYIFAKELDGKDINILFNSQYTVNVKDYWGNDLRVYKYYMNDYL 1111
    |---|
1093
1120 NRYMYANSQIVFNTNRNNDNENEGYKIIKIRIGNTNDRVRGGDILYFDMTINNKAYN 1168
    |---|
1145
1180 LFMKNETMYADNHSTEDIYALGREQTKDINDNIIFQIQPMNTYYASQIFKSNFNGEN 1224
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1181
1240 ISGICSGTYRFLGGDWYRHNLYVTVKQGNYSALLESTSTHNGFVPVSE 1272
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1272
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24 matches found in sequence:
bxcnclobo ; Botulinum neurotoxin type C1, nontoxic component.
(from "Bt_sp.pep")
TOIG of: bxcn_clobo check: 1182 from: 1 to: 1196
ID BXCN_CLOBO STANDARD; PRT; 1196 AA.
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AC P46081;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-NOV-1995 (Rel. 32, Last sequence update)
DT 01-NOV-1995 (Rel. 32, Last annotation update)
DE Botulinum neurotoxin type C1, nontoxic component.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type C Stockholm / C-ST;
RX MEDLINE=3221894; PubMed=1567404;
RA Tsuzuki K., Kimura K., Fujii N., Yokosawa N., Oguma K.;
RT "The complete nucleotide sequence of the gene coding for the
RT nontoxic-nonhemagglutinin component of Clostridium botulinum type C
RT progenitor toxin.";
RL Biochem. Biophys. Res. Commun. 183:1273-1279(1992).
CC -!- FUNCTION: THE NONTOXIC COMPONENT IS NECESSARY TO MAINTAIN
CC TOXICITY.
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; X62389; CAA44262.1;
CC InterPro; IPR008985; ConA like lec gl.
CC InterPro; IPR000395; Peptidase M27.
CC Pfam; PF01742; Peptidase M27; 1.
CC PRINTS; PR00760; BONTOXILYSIN.
CC ProDom; PD001963; Bontoxilysin; 1.
CC Neurotoxin.
CC SEQUENCE 1196 AA; 138740 MW; 4BD5956274D7F9C3 CRC64;
CC -----
BXCN CLOBO Length: 1196 September 1, 2004 07:06 Type: P Check: 1182
Found using 'seq23' (hayes346.key)
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60 DGGIYDSNFLSQDSERENFLOAIILLKRINNTISGKQLLSLIISTAIPFPYIGGYSS 110
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120 PNIFFGTGTPSKNKLNSLVSTIPFPFGGYRETHYIESQNNKNFYASNIIFGPGSNIV
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211
180 ENNVYKKKNDANGMGMTMAEIVFQPLLTYKYNFYIDPAMELTCLIKSLYFLYGIKPS 231
    |---|
211
240 DNLVVPYRLRTELDNKFQSQLNIIDLLISGGVDLEFINTNPTWFTNSFPNSIKMFEKVK 298
    |---|
298
300 NIYKTEIEGNAIGNDIKRLKQKQINVQDIWNLNLNYFCQSFNSIIPDRFSNALKHFY 301
    |---|
301
360 RKQYTYTMDYTDNYNINGFVNGQINTKLPKSNKNTNIIISKPEKVVNLVNNENISLMKSNY 363
    |---|
363
420 GDGLKGTTEDFYSTYKIPYNEEYEFNDSNFPPLNNISIEEVDISIPEIIDINPKDNSD 431
    |---|
431
480 NLVFTQITSMTEEVTTHTALSINYLQAIQTNNENFTLSSDFSKVSSKDKSLVYSPDLNL 503
    |---|
503
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KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT CHAIN 1 442 BOTULINUM NEUROTOXIN D, LIGHT-CHAIN.
FT CHAIN 443 1276 BOTULINUM NEUROTOXIN D, HEAVY-CHAIN.
FT METAL 229 229 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT_SITE 230 230 BY SIMILARITY.
FT METAL 233 233 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 437 450 INTERCHAIN (PROBABLE).
FT VARIANT 15 16 ND -> PV (IN STRAIN D-SA).
FT VARIANT 17 18 ND -> LQ (IN STRAIN D-1873).
FT VARIANT 452 452 K -> Q (IN STRAIN D-SA).
FT VARIANT 457 457 R -> T (IN STRAIN D-SA).
FT VARIANT 457 457 R -> F (IN STRAIN D-1873).
FT VARIANT 462 462 A -> D (IN STRAIN D-1873).
FT VARIANT 489 489 K -> N (IN STRAIN CB16).
FT VARIANT 644 644 N -> K (IN STRAIN CB16).
FT VARIANT 1122 1122 Q -> R (IN STRAIN CB16).
SQ SEQUENCE 1276 AA; 146871 MW; 146871 MW; CLECS0F46C8233E2 CRC64;
BXD_CLOBO length: 1276 September 1, 2004 07:06 Type: P Check: 326 ..
Found using 'seq23' (hayes346.key)
1 MTWPKVDNYPVNDNDILYRIPQNKLLITPVKAFMITQNIWIPERFSSDTPNPSLSK
21 24
61 PPRPTSKYQSYDPSYLSSTDEQKDTFLKGIILKFKRINERDIGKKLNLVYVGGSPMGDS
68 71
121 STPEDTFDTRHTTNIAVEKFENGSKWVTNIIITPSVLIFGPL
...
247 KRIQVSEGFSGQDPNVQPEELTFGLDVEIIPQIERSQLREKALGHYKDIAKRLNN
297
307 INKTIPSSWISNIDYKKIFSEKYNFDKNTGCVFNIDKNSLYSDLTNNVSEVYSSQ
322 351
367 YNKNRTHYFSRHLFPANILDDNIYTIRDGFLNTKGFNIENSGQNIERNPALQKLLS
380
427 ESWVDLF
...
480 ETNVQNSDKFSLDBSILDGQVPINPEIVDPLLPNNVMEPLNPGEEIVFYDDITKYVDY
530 536
540 LNSVYLESQKLSNNVENITLTSVEEALGYSNKIYTFPLSLAEKVNKGVOAGLFLNWN
543 575
600 EWVEDFTTNIMKOTLDKISDVSVIIPYIGPALNIGSALRCGNFQAFAATAGVAFLEGF
660 PEFTIPALGVTFYSSIOEREKIIXTIENCLUEQVRKRWKDSYQWVSNWLSRITTFQNH
673 701
720 NYQWYDLSYQADAIKAKIDLEYKKYSGSDKENIKSQVENLKNSLDKISEAMNNINKFI
721 724
780 RBCSVTYLTKNNLPKV
...

874 NKNKALVDTSGYNAEVRVGDNVQLNTIYTDFKLSSGDKIIVNLNNNLLYSAIYENSSV
924
934 SPWIKISKDLTNSHNEYTIINSIQNSGKLCIRNGNIEMIQLQDVNRKYKSLIFDYSESL
950 982
994 SHTGYNKWFVFTIITNNIMGYMKLYINGELKOSQKIEDLDEVKLDKTIIVFGIDENIDNQ
1014
1054 MLWIRDENIFSKELSNEDINIVVEGILLNRVVKDYWGPNLKFDETYEYIINDYNDYRIAP
1099
1114 ESNVLVLVQYPRDSKLYTGNPITIKSVSDKNPYSRILNGDNIILHMLYNSRKYMIIRDTD
1146
1174 TIYATQGGECSONCVYALKLQSNLGNYGIGIFSINKVSKYKCSQIFSSFFRENTMLLAD
1234 IYKPRFRFSKNAYTEVAVNTYETKLLSTSSFWKFIISRDPGWVE
1235 1246

24 matches found in sequence:
Bxeclobo ; Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
(from "bt_sp.pep")
TOIG of: Bxe_clobo check: 586 from: 1 to: 1250
ID BXE_CLOBO STANDARD; PRT; 1250 AA.
AC Q00496;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
DE Bontoxilysin E)
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Beluga;
RX MEDLINE=92181428; PubMed=1543481;
RA Poulet S., Hauser D., Quanz M., Niemann H., Popoff M.R.;
RT "Sequences of the botulin neurotoxin E derived from Clostridium
RT botulinum type E (strain Beluga) and Clostridium butyricum (strains
RT ATCC 43181 and ATCC 43755).";
RL Biochem. Biophys. Res. Commun. 183:107-113(1992).
RN [2]
RP SEQUENCE FROM N.A.
RX MEDLINE=92174922; PubMed=1541280;
RA Whelan S.M., Elmore M.J., Bodsworth N.J., Atkinson T., Minton N.P.;
RT "The complete amino acid sequence of the Clostridium botulinum type-E
RT neurotoxin, derived by nucleotide-sequence analysis of the encoding
RT gene.";
RL Eur. J. Biochem. 204:657-667(1992).
RN [3]
RP SEQUENCE OF 1-251 FROM N.A.
RX MEDLINE=90264400; PubMed=2160960;
RA Binz T., Kurazono H., Wille M., Frevert J., Wernars K., Niemann H.;
RT "The complete sequence of botulinum neurotoxin type A and comparison
RT with other clostridial neurotoxins.";
RL J. Biol. Chem. 265:9153-9158(1990).
RN [4]
RP SEQUENCE OF 1-13.
RX MEDLINE=85197963; PubMed=3888113;
RA Schmidt J.J., Sathiyamoorthy V., Dasgupta B.R.;
RT "Partial amino acid sequences of botulinum neurotoxins types B and
RT E.";

Arch. Biochem. Biophys. 238:544-548(1985).
[5]
SEQUENCE OF 419-426.
MEDLINE=90344918; PubMed=2116911;
RA Gimenez J.A., Dasgupta B.R.;
RT "Botulinum neurotoxin type E fragmented with endoproteinase Lys-C
RT reveals the site trypsin nicks and homology with tetanus
RT neurotoxin."; Biochimie 72:213-217(1990).
RL Biochimie 72:213-217(1990).
RN [6]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94124495; PubMed=8294407;
RA Binz T., Biasi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C.,
RA Jahn R., Niemann H.;
RT "Proteolysis of SNAP-25 by types E and A botulinum neurotoxins.";
RL J. Biol. Chem. 269:1617-1620(1994).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 180-ARG-|-ILE-
CC 181 BOND IN SNAP-25.
CC -!- CATALYTIC ACTIVITY: limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel
CC formation and toxin binding, respectively.
CC -!- SUBCELLULAR LOCATION: Secreted.
CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -!- SIMILARITY: Belongs to peptidase family M27.

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CC or send an email to license@isb-sib.ch).

DR EMBL; X62089; CAA43999.1; -;
DR EMBL; X62683; CAA44558.1; -;
DR PIR; S08575; S08575.
DR PIR; S21178; S21178.
DR KSSP; P10845; 3BTA.
DR MEROPS; M27.002; -;
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT INIT MET 0
FT CHAIN 1 421 BOTULINUM NEUROTOXIN E, LIGHT-CHAIN.
FT CHAIN 422 1250 BOTULINUM NEUROTOXIN E, HEAVY-CHAIN.
FT METAL 211 211 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT SITE 212 212 BY SIMILARITY.
FT METAL 215 215 ZINC (CATALYTIC) (BY SIMILARITY).
FT METAL 215 215

FT DISULFID 411 425 INTERCHAIN (PROBABLE).
FT CONFLICT 176 176 R -> G (IN REF. 2).
FT CONFLICT 197 197 C -> S (IN REF. 2 AND 3).
FT CONFLICT 339 339 R -> A (IN REF. 2).
FT CONFLICT 772 772 I -> L (IN REF. 2).
FT CONFLICT 962 963 FE -> LQ (IN REF. 2).
FT CONFLICT 966 966 R -> A (IN REF. 2).
FT CONFLICT 1194 1194 N -> NN (IN REF. 2).
SQ SEQUENCE 1250 AA; 143712 MW; D9FCE26DDA041EB4 CRC64;

BXE CLOBO Length: 1250 September 1, 2004 07:06 Type: P Check: 586
Found using 'seq23' (havea346.key)

1 PKINSFNYPVNDRTILYIKPGCGQBFYKSFNMKNMNIWIIPERNVIGITTPQDFHPTSL
29 32
61 KNGDSSYDNPYLQSDDEKDRF
...
221 YGAKGITTKYITQKONPLITNIRGTNIEBFLTFGGTDLNLIITSAQSNDIYTNLLADYKK
271 278
281 IASKLSKVQSVNELLNPYKDVFEAKYGLQKDAAGSIYVNVINKNFDFKKLYSTFEDLRT
298
341 KFOVKCRQTVIGQYKFKLSNLNLSIYNSISSEGINNLLKNVFRGQANLNPLIITPG
354
356
401 RGLVKKIIR
...
471 ILNFSSEAFGLSDEKINLTIONDAVIPKYDSNGTSDIEQHDVNMELNVFFYLDQAQKVEG
521
531 ENNVLTSSIDTALLBQPKIYTFSESEFINNVNKPVOAALFVSWIQOVLVDFTEANQKS
551
591 TVDKIADISIVVPYIGLALNIGNEAQKGNFKDALELLGAGILLEPEPELLIPTILVFTIK
604
651 SFLGSSDNKNKVIKAINNALKERDEKWEKYSFVSNNMTKINTQFNKRKEQMYQALQNG
681
704
711 VNAKTIIESKYSYILEEKVELTNKYDIKQIENELNQKVSIAANNIDRFLTESSISYLM
722
771 KIINE
...
854 MRYKNDKYVDTSGYDSNININGDVKYPTNKNQFGIYNDKLSSEVNSIQNDYIITYDNKYKN
904 911
914 FSISSFWRIPNDYNDKIVNVNNEYTIINCMDNNSGKVSINHNHEIITWFEDNRGINOKLA
936
974 FNYGNANGISDIYINKWIFVTITNDRLGDSKLYINGNLIDQKSIINLGNLHVSDNILPKIV
996

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976
1034 1037 1045 1078 1085
NCSTRYGIRYFNFKELDETEIQTLYSNPEPNTILKDFGWNLYDKKEYYLNLVKP
1040
1094 1148
NNFIDRRKDSILSINNIRSTILLANRLYSIGIKVQLQRVNNSSTNDNLVRKQDVVNLFA
1121
1154 SKTHFLPYADTATTNKBKTIKISSGNRFNQVVVNVSVGNCNMFKNNGNIGLLGFK
1214 1224
ADTVVASTWYTHMRDHTNSNGCFWNFISEEHGWQEK
1224

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24 matches found in sequence:
bxeclobu ; Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
(from "bt sp.pep")
TOIG of: bxe_clobu check: 9545 from: 1 to: 1250

ID BXE CLOBU STANDARD; PRT; 1250 AA.
AC P30995;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
DE (Bontoxilysin E).
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 43181, and ATCC 43755;
RX MEDLINE=92181428; PubMed=1543481;
RA Poulet S., Hauser D., Quanz M., Niemann H., Popoff M.R.;
RT "Sequences of the botulinum neurotoxin E derived from Clostridium
RT botulinum type E (strain Beluga) and Clostridium butyricum (strains
RT ATCC 43181 and ATCC 43755).";
RL Biochem. Biophys. Res. Commun. 183:107-113(1992).
RN [2]
RP SEQUENCE OF 1-251 FROM N.A.
RC STRAIN=BL6340;
RX MEDLINE=91237316; PubMed=2033376;
RA Fujii N., Kimura K., Murakami T., Indoh T., Tsuzuki K.,
RA Yokosawa N., Yashiki T., Oguma K.;
RT "Cloning of a DNA fragment encoding the 5'-terminus of the botulinum
RT type E toxin gene from Clostridium butyricum strain BL6340.";
RL J. Gen. Microbiol. 137:519-525(1991).
RN [3]
RP SEQUENCE OF 1-48.
RC STRAIN=5262;
RA Gimenez J., Foley J., Dasgupta B.R.;
RT "Neurotoxin type E from Clostridium botulinum and C. butyricum;
RT partial sequence and comparison.";
RL FASEB J. 2:A1750-A1750(1988).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE.
CC -!- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel

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CC formation and toxin binding, respectively.
CC -!- SUBCELLULAR LOCATION: Secreted.
CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -!- SIMILARITY: Belongs to peptidase family M27.
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; X62088; CAA43998.1; -.
CC EMBL; X53180; CAA37321.1; -.
CC PIR; JH0256; JH0256.
CC HSSP; P10845; 3BTA.
CC MEROPS; M27.002; -.
CC InterPro; IPR008985; ConA like lec gl.
CC InterPro; IPR002160; Kunitz legume_g.
CC InterPro; IPR006025; Pept_M_Zn_BS.
CC InterPro; IPR000395; Peptidase_M27.
CC Pfam; PF01742; Peptidase M27; 1.
CC PRINTS; PR00760; BONTOXILYSIN.
CC ProDom; PD001963; Bontoxilysin; 1.
CC Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT INIT_MET 0 0
FT CHAIN 1 421 BOTULINUM NEUROTOXIN E, LIGHT-CHAIN.
FT CHAIN 422 1250 BOTULINUM NEUROTOXIN E, HEAVY-CHAIN.
FT METAL 211 211 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT_SITE 212 212 BY SIMILARITY.
FT METAL 215 215 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 411 425 INTERCHAIN (PROBABLE).
FT CONFLICT 229 229 K -> M (IN REF. 2).
SQ SEQUENCE 1250 AA; 143265 MW; 8171B5B2C312857 CRC64;

BXE CLOBU Length: 1250 September 1, 2004 07:06 Type: P Check: 9545
Found using 'seq23' (hayes346.key)

1 PTINSFNVDPNVRTILYIKPGGQQYKFSFNIMKNIWIIPERNVIGTIPQDFLPPTSL
29 32

61 KNGDSSYYDPNVLQSDQEKKE

...

221 YGAGITTKYITQKQPLTINIRGTNIEEFLTFGGTDLNITSAQSNIDVYNLLADYKK
271 278

281 IASKLSKVQVSNPLNPNFYKQVFEAKYGLDKDASGIYSVNIKNFNIDFKKLYSTFEFLAT
281 298

341 KFOVKCRQTYIGQYKFKLSKLLNDSIYNISEGYNINNLKVNFRQGNANLNPRIITPTIG
354 356

401 RGLVKKIIR

...

471 ILNFNSAPGLSDEKLNLTIQNDAYIKPYDSNGTSDIEQHDVNLNLFVFFYLDQAKVPEG
521

531 ENNVNLTSSIDTALLEQPKIYTFSSSEFINNVNKFVQAALFVGMIQQVLVDFTTEANQKS

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551
591 TVDKTIADISIVVPIYIGLALNIGNEAKGNFKDALELLGAGILLEPEPELLIPTILVFITIK
604
651 SFLGSSDNKKVKAINNALKRDEKWKVEYFSFVSNWMTKINTQPKRKQKQYQALQNO
681
711 VNALKALIESKSNSTLEBKELTNKYDIEQIENELNQKVSIAMNNIDRFLTESSISYLM
722
771 KLINE
...
854 MRYKNDKYVDTSGYSNININGVYKYPTKNQFGIYNDKLVSEVNISQNDYIIYDNKYKN
904
914 FSISSFWRIPNYDNKIVNVNNEYTLINCMDRDNNSGWKVSINHNEIILWTIQDNSGINQKLA
936
974 FNYGNANGISDYINKWIFVTITNDRLGSKLYINGNLIDKKSILNLGNIHVSDNLFKIV
976
1034 NCSTRYGIRFYFNIPDKELDETEIQTLYNNPENANILKDFWGNLYLLYDKYLYLVNLPK
1037
1094 NNFINRDTSTLSINNIRSTILLANLYSGIKVKIQORVNNSTNDNLVRKNDQVYINFVA
1121
1154 SKTHLLPLYADATTNKEKTIKISSGNRFQVVMNSVGNCTMFKNNNGNNGNIGLGFK
1224
1214 ADTVVASTWYTHMRDNTNSNGFFWNFISEHGWQEK
1224
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29 matches found in sequence:
bxclobo; Botulinum neurotoxin type E, nontoxic component.
(from "bt_sp.pep")
TOIG of: bxclobo check: 8485 from: 1 to: 1162

ID EXEN CLOBO STANDARD; PRT; 1162 AA.
AC P46082;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-NOV-1995 (Rel. 32, Last sequence update)
DT 01-NOV-1995 (Rel. 32, Last annotation update)
DE Botulinum neurotoxin type E, nontoxic component.
ENT-120.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Mashike;
RX MEDLINE=93195515; PubMed=8450310;
RA Fujii N., Kimura K., Yokosawa N., Yashiki T., Tsuzuki K., Oguma K.;
RT "The complete nucleotide sequence of the gene encoding the nontoxic
component of Clostridium botulinum type E progenitor toxin.";
RL J. Gen. Microbiol. 139:79-86(1993).
CC -!- FUNCTION: THE NONTXIC COMPONENT IS NECESSARY TO MAINTAIN
TOXICITY.
```

699 SNOSQIAINNIDKFFNNAAMCVFENNIPKFTSPWEQCIKNINKSTKEFILKCTNINETE
726
759 KSHLIMQNSFSLNDFDLQNMKNLNLNLTLLIKBQTSYELSLYAFQDNNVIGDT
788
819 SGKNTLVEYPKDIGLVYGINNAIHLTGANQIKFTNDYPENGLTNNFSIYFWLNLKQN
869
879 TIKSKLIGSKEDNCGWEIYFENDGLVFNIDISNGNEKNIYLSNKSWHYIVISNRLK
929
939 DQLLIFIDNILVANEDIKEILNIYSSDIISLLSDNNVYIEGLSVLAKTINSNAILTDYF
1020
999 SDLNNSYIRNFDEEILQYNRTEYELFNVPFPAINKIEQNNNIYLSINNENNLNFKPLKF
1042
1059 KLNTNPNKQVQWDEVIFSLDGTGKYLIDISTNNRIQLVDNKNNAQPIINNDIFIS
1087
1119 NCLTLTNVNVYLSIKNQDYNWICDLNHDIPKSKYLWILKNI
1125 1131 1139 1155

28 matches found in sequence:

bxenclobu ; Botulinum neurotoxin type E, nontoxic component.
(from "bt sp.pep")

TOIG of: Bxen_clobu check: 7133 from: 1 to: 1162

ID BZEN_CLOBU STANDARD; PRT; 1162 AA.
AC Q06366;
DT 01-FEB-1995 (Rel. 31, Created)
DT 01-FEB-1995 (Rel. 31, Last sequence update)
DT 01-NOV-1995 (Rel. 32, Last annotation update)
DE Botulinum neurotoxin type E, nontoxic component.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=BL6340;
RX MEDLINE=93360835; PubMed=8355622;
RA Fujii N., Kimura K., Yokosawa N., Oguma K., Yashiki T.,
RA Takeshi K., Ohyama T., Isogai E., Isogai H.;
RT "Similarity in nucleotide sequence of the gene encoding nontoxic
component of botulinum toxin produced by toxigenic Clostridium
RT butyricum strain BL6340 and Clostridium botulinum type E strain
RT Mashike.";
RL Microbiol. Immunol. 37:395-398(1993).
CC -!- FUNCTION: THE NONTOXIC COMPONENT IS NECESSARY TO MAINTAIN
CC TOXICITY.
CC
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CC
CC EMBL; D12739; BAA02231.1; -.
DR PIR; I40817; I40817.
DR InterPro; IPR008985; ConA like lec_g1.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; I.

DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
KW Neurotoxin. 1162 AA; 136829 MW; C86E9BE932DA78E4 CRC64;
SQ SEQUENCE 1162 September 1, 2004 07:06 Type: P Check: 7133 ..
BXEN CLOBU Length: 1162 September 1, 2004 07:06 Type: P Check: 7133 ..
Found using 'seq23' (hayes346.key)
...
80 ATIKLQRIINNNGVAKLSLSLISTAIPFPYENNTEDYRQTNLYSSKNEHYTTANLVIFG
130
140 PGSNIIKNNVIYKKEYAENGMTMLSEIWFQPFTHKYDEFYVDPALIKLKLSLYL
177
200 YGIKPNLNLNIPYRLRNEFNSLEYSELDMDIFLISGGIDYKLLNTNPPYWFIDKYFIDTSK
200 223 239 247
260 NFEKYKNDYEIKKNNYIANSIKYLEQKPKINVKDIWELNLSYFSKKEFOIMMPERYNN
317
320 ALNHYRKEFVVIDYFKNYINGFKNGQIKTKPLSKYKKEIINKPELIVNLINQNNIVL
320
380 MKSNFYDGLKGNVDNFYSNVIIPYNLNYEHSINYSYLDNWNVIEIEIKPIPNDEDIYFY
397 414
440 RKNADTFIPVNYITKAKEINTTLPVNYLOAQMIDNSDNLSSDFLKVSKSGLSYSF
468 497
500 LNNMTDYLEFIKYDKPIDTDKKYKWLKALFRNYSYLDITETQEISNOFGDTKIIPWIGRA
500 506 522 523
560 LNLNTNNSFVEEPKNI
...
579 IFLINKKENITIPKIKIDEIPSSMLNFSFKDLSNLFNIYCKNNFYLKLYNFDQWWT
629 630
639 QYYSQYFDLICMAKSVLAQEKLIKLIQKQLRYLMENSNISSTNLILNLTNTTLRDI
641 644
699 SNOSQIAINNIDKFFNNAAMCVFENNIPKFTSPWEQCIKNINKSTKEFILKCTNINETE
726
759 KSHLIMQNSFSLNDFDLQNMKNLNLNLTLLIKBQTSYELSLYAFQDNNVIGDT
788
819 SGKNTLVEYPKDIGLVYGINNAIHLTGANQIKFTNDYPENGLTNNFSIYFWLNLKQN
869

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879  TIKSLIGSKEDNCGEIYFENNGLVFNLIIDSGNEKNIYLSNISKNSWHYIVISINRLK
      929
939  DQLLIFIDNILVANEDIKEILNIYSDIIISLSDNNVYIEGLSVLNKNTINSNEILTDYF
      1020
999  SLDNNSYIRNFDDEILQYNRTYELFNVPFETAINKEIQNNNIYLSNNNENSLNFKPLKF
      1020
1059 KLLNTNPNKQYQKWDVFISVLDGTGTEKLDISIDNNRIQLVDNKNNAKFTIINDIFIS
      1087
1119 NCLTLYNNVNVYLSIKNQDYNWVICDLNHDIPKSKSYLWILKNI
      1125 1131 1139 1155
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30 matches found in sequence:
bxfClob; Botulinum neurotoxin type F precursor (EC 3.4.24.69) (BoNT/F)
TOIG of: Bxf_clob check: 2696 from: 1 to: 1274

ID BXF_CLOBO STANDARD; PRT; 1274 AA.
AC P30396;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type F precursor (EC 3.4.24.69) (BoNT/F)
DE (Bontoxilysin F).
GN BOTF.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 23387;
RX MEDLINE=93012902; PubMed=1398040;
RA East A.K., Richardson P.T., Allaway D., Collins M.D.,
RA Roberts T.A., Thompson D.E.;
RT "Sequence of the gene encoding type F neurotoxin of Clostridium
RT botulinum.";
RL FEMS Microbiol. Lett. 75:225-230 (1992).
RN [2]
RP SEQUENCE OF 1-64 FROM N.A.
RC STRAIN=Hobbs FT10;
RX MEDLINE=94297488; PubMed=7764998;
RA East A.K., Collins M.D.;
RT "Conserved structure of genes encoding components of botulinum
RT neurotoxin complex M and the sequence of the gene coding for the
RT nontoxic component in nonproteolytic Clostridium botulinum type F.";
RL Curr. Microbiol. 29:69-77 (1994).
RN [3]
RP SEQUENCE OF 634-1002 FROM N.A.
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
RT specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262 (1993).
RN [4]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94230352; PubMed=8175689;
RA Yamasaki S., Baumeister A., Binz T., Blasi J., Link E., Cornille F.,
RA Roques B., Fyke E.M., Suedhof T.C., Jahn R., Niemann H.;
RT "Cleavage of members of the synaptobrevin/VAMP family by types D and
RT botulin neurotoxins and tetanus toxin.";
RL J. Biol. Chem. 269:12764-12772 (1994).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC

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CC ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 58-GLN--LYS-59
CC BOND OF SYNAPTOBREVSIN-1 AND -2.
CC -!- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: disulfide-linked heterodimer of a light chain (L) and a
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CC while the N- and C-terminal of the heavy chain mediate channel
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CC
CC EMBL; M92906; AA23263.1; -
CC EMBL; S73676; AAC60475.1; -
CC EMBL; X70820; CAA50151.1; -
CC EMBL; X70816; CAA50147.1; -
CC PIR; I40813; I40813.
CC PIR; S48109; S48109.
CC HSP; P10845; 3BTA.
CC MEROPS; M27.002; -.
CC InterPro; IPR008985; ConA like lec.gl.
CC InterPro; IPR002160; Kunitz legume.
CC InterPro; IPR006025; Pept M Zn BS.
CC InterPro; IPR000395; Peptidase M27.
CC Pfam; PF01742; Peptidase M27; 1.
CC PRINTS; PR00760; BONTOTOXILYSIN.
CC ProDom; PD001963; Bontoxilysin; 1.
CC PROSITE; PS00142; ZINC_PROTEASE; 1.
CC Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT CHAIN 1 436 BOTULINUM NEUROTOXIN F, LIGHT-CHAIN.
FT CHAIN 437 1274 BOTULINUM NEUROTOXIN F, HEAVY-CHAIN.
FT METAL 227 227 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT_SITE 228 228 BY SIMILARITY.
FT METAL 231 231 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 429 445 INTERCHAIN (PROBABLE).
SQ SEQUENCE 1274 AA; 146709 MW; 5B99756A7438B921 CRC64;
BXF_CLOBO Length: 1274 September 1, 2004 07:06 Type: P Check: 2696 ..
Found using 'seq23' (hayes346.key)
1 MPVAINSFNVPVNDTILYMOIPVEEKKYKAFETMRNVWIIPERTNIGTFPSDFD
21 24 33 36 34 37
61 PFASLKGSSAYDPNPLYTTDAEKDRY
...
237 YGARGVYETIEVKQAPLMIAEKPIRLBEFLTFGQDLNIITSAMKEKIYNLLANYEK
287 294
297 IATRLSEVNSAPPEYDINIKDYFQWKYGLDKNADGSYTVNENKFNKYKLYSFTESDL
297 316 319
357 ANKFKVKCRNTYFIKFEFLKVPNLLDDDIYTVSEGNIGNLAVNREGQSIKLPKLIISI

```

```
417      PKGLVEKI
...
481      NNVRNLDVILDYNSQITIPQISNRTNLTNLVQDNSYVPRYDSNGTSEIEEYDVVDVNFVF
      |--|
      531
481      NNVRNLDVILDYNSQITIPQISNRTNLTNLVQDNSYVPRYDSNGTSEIEEYDVVDVNFVF
      |--|
      531
541      YLHAQKVPGETNISLTSSIDTALLESKOIFFSEFIDTINKPVAALFIDWISKVIRD
      541
601      FTTEATQKSTVDKIADISLIVPYVGLALNIIIEAKGNFEAPFELLGVGILLFVPELTI
      |--|
      623
661      PVILVFTIKSYIDSYENKKAINKAINSLIBREAKWEIYSWIVSNMLTRINTQFNKRKE
      |--|
      700
721      QMYQALQNDVAIKTAIEYKNNYTSDEKNLESEYNNINIEELNKKVSLAMKNIERFM
      |--|
      741
781      TESSISYLMKLINE
...
812      LNYILDHRSILGEQTNELSDIVTSLNSSIPFELSSYTNDKILIIYFNRLYKIKDSSIL
      |--|
      862
872      DMYENNKFDISGYGNSISNGVNIYSTNRNOFGIYNSRLSEVNIAQNNDIILYNSRYQ
      |--|
      930
932      NFSISFWVRIPKPKMHNREYTIICMGNNSGWKISLRTVDCBLIWTLDQTSNGKE
      |--|
      945
      954
992      NLIPRYEELNRSINYINKWIFVTITNRLGNSRIYINGNLIVEKISNLGDIHVSNDILF
      |--|
      997
1052      KIVCDDETVYGIYFKVFNTELOKTEIETLYSNEPDPSILKNYGNVLLYKYYILFNL
      |--|
      1061
      1066
      1099
      1106
1112      LRKDKYITLNSGILNINQOQVTEGVSFLNKLKGVEVIIRKNGPIDISNTDNFVRKND
      |--|
      1117
      1142
      1145
1172      LAYINVVDGRGVEYRLYADTKSEKEKIIRTSNLNDSLGIIIVMDSIGNCTNWFQNNNSN
      |--|
      1174
      1184
1232      IGLGPHSNLNVASSWYNNIRNTSSGCFWSSISKENGWKE
      |--|
      1249
```

29 matches found in sequence:

bxg_clobo ; Botulinum neurotoxin type G precursor (EC 3.4.24.69) (BoNT/G)
(from "bt.sp.pap")
TOIG of: bxg_clobo check: 1561 from: 1 to: 1296

ID BXG_CLOBO STANDARD; PRT; 1296 AA.

AC Q60393;

DT 01-NOV-1997 (Rel. 35, Created)

```
DT 01-NOV-1997 (Rel. 35, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type G precursor (EC 3.4.24.69) (BoNT/G)
DE (Bontoxilysin G).
GN BOTG.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=113 / 30;
RX MEDLINE=94092745; PubMed=8268233;
RA Campbell K., Collins M.D., East A.K.;
RT "Nucleotide sequence of the gene coding for Clostridium botulinum  
(Clostridium argentinense) type G neurotoxin: genealogical comparison  
with other clostridial neurotoxins.";
RL Biochim. Biophys. Acta 1216:487-491 (1993).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER  
RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED  
AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD  
WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT  
INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC  
ENDOPEPTIDASE.
CC -!- CATALYTIC ACTIVITY: limited hydrolysis of proteins of the  
neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No  
detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a  
heavy chain (H). The light chain has the pharmacological activity,  
while the N- and C-terminal of the heavy chain mediate channel  
formation and toxin binding, respectively.
CC -!- SUBCELLULAR LOCATION: Secreted (By similarity).
CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of  
botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -!- SIMILARITY: Belongs to peptidase family M27.
CC -----
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CC -----
DR EMBL; X74162; CAA52275.1; --
DR HSPSP; P10845; 3BTA.
DR MEROPS; M27.002; --
DR InterPro; IPR008985; ConA_like_lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin; Hydrolase; Metalloprotease; Zinc.
FT INIT MET 0
FT CHAIN 1 441
FT CHAIN 442 1296
FT METAL 229
FT METAL 230
FT ACT SITE 230 233
FT METAL 233 233
FT DISULFID 435 449
FT SEQUENCE 1296 AA; 149013 MW; DC8E47E15F665C31 CRC64;
SQ
BXG_CLOBO Length: 1296 September 1, 2004 07:06 Type: P Check: 1561
Found using 'seq23' (hayes346.key)
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1 PVNIKXFNNDPINDDIIMMFPNDPFGTYKAFRIIDRIWIVPFTYGFQPDQENA

32 35

```

33 36
61  STGVFSKQVYEDPTYLTKDAEKDFLTKMTIKLFNRINSPKSGQRLDMIVDAIPVLGN
    70 73
121  AST
...
238  LYGIKISNLPITPNTKEFFMQHSDPVQAEELYTFGGHDPVISPTDMNIYKALQNFQD
    288
298  IANRLNIVSSAOGSGIDISLYKQIYKKNKYDFVBDPNKGYSVDKDFDKLYKALMFGFTET
    318 326
358  NLAGYGIKTRYSEYSEYLPPIKTEKLLDNTIYTQNEGNIASKNLKTFFNGQNKAVNKE
    369
418  AYEISLHLVIRIAMCKPVMYKNTGKSEQCIIVNEDLFFIANKDSFSKOLAKAETIA
    419 430
478  YNTQNN
...
494  LILDNLSSGIDLPLENTEFTNFDDIDIPVIYKQALKKIFVDGDSLFEYHQAFTPSN
    544
554  IENLQLTNSLNDALRNNKVYTFSTNLVEKANTVVGASLFVNWVGVIDDFTSESTQKS
    574
614  TIDKVS DSVIIPY
...
651  GAAILMEFPELIVPIVGPTLESYVGNKGHIIMTISNALKXRDQKWTMDMYGLIVSQWLS
    701
711  TVNTQPTTKERMYNALNQSAIEKIEIQYNYRYSEEDKMNINIDFNDIDFKLNQSNIL
    724 742
771  AINNIDDFINQCSISYLMNRMIPLA
...
875  RCGRLIDSSGYGATMNVGSDVIFNDIGNQFKLNNSENITAHQSHQFVYVDSMPDNFSI
    925
935  NEWVTPKYNNDIQTLQNEYTILISCIKNSGKVSIGKNRIITWTLIDVNAKSIFFE
    956
995  YSIKONISDYINKWF
...
1055  TDTTFEVIWKDFNIFGRELNATEVSSLYWISQSTNTLKDFWGNPLRYDTQYLYFNQGMQN
    1105
1115  IYIKYFSKASMGETAPTTFNFAAINYNQNLGLRLFIKKASNRNNDNVREGDIY
    1172 1174
```

```

1116 1141 1145 1172 1174
--| | | | |
1175  LAINDISDESRYVYVLVNSKEIQTLFLAPINDPFTFYDVLQIKKKYKTYNQCILCEK
    1175 1185 1212
    1177 1188
1235  DTKTFLGIGKFKVDYGYWTDYNYFCISQWYLRISENINKLRGNCWQFIPVDEGW
    1251 1258 1261
1295  TE
-----
4 matches found in sequence:
hal7c1obo ; Hemagglutinin component HA-17 (HA 17 kDa subunit).
(from "bt.sp.pep")
TOIG of: hal7_c1obo check: 6580 from: 1 to: 145

ID HA17_C1OBO STANDARD; PRT; 145 AA.
AC P46083;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-FEB-1996 (Rel. 33, Last sequence update)
DT 15-DEC-1998 (Rel. 37, Last annotation update)
DE Hemagglutinin component HA-17 (HA 17 kDa subunit).
GN HA-17 OR ANTP-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 1-20.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=95100958; PubMed=7802661;
RA Fujinaga Y., Inoue K., Shimazaki S., Tomochika K., Tsuzuki K.,
RA Fujii N., Watanabe T., Ohyama T., Takeshi K., Inoue K., Oguma K.;
RT "Molecular construction of Clostridium botulinum type C progenitor
RT toxin and its gene organization.";
RL Biochem. Biophys. Res. Commun. 205:1291-1298 (1994).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=Type C Stockholm / C-ST / 468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C 468.";
RL Mol. Gen. Genet. 243:631-640 (1994).
CC -!- SUBUNIT: HA IS COMPOSED OF SUBCOMPONENTS HAVING 53, 33, 22-23, AND
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC
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CC
CC -----
CC EMBL; X62389; CAA44260.1; -
CC EMBL; S74768; AAE32848.1; -
CC EMBL; X72793; CAA51310.1; -
CC InterPro; IPR008903; Botulinum HA-17.
CC InterPro; IPR00772; Ricin B lectin.
CC Pfam; PF05588; botulinum HA-17; 1.
CC SMART; SM00458; RICIN; 1.
CC Hemagglutinin.
KW
```

```

FT INIT MET 0
SQ SEQUENCE 145 AA; 16531 MW; D5EPAB577336D710 CRC64;
HA17 CLOBO Length: 145 September 1, 2004 07:06 Type: P Check: 6580
Found using 'seq23' (hayes346.key)

1 SSBRTPLPNGYKIKSLFSDSLYLYTSGGALSPFNTSSLDNQKWKLEVISSNGFRFSNV
  23 26
  |--|
  |---|
  |---|
  66 69 72 75
  69 72

61 AEPNKYLAYNDYGFYLYSSSSNSLWNPKIANSYIICLTSLVNVTDYAWTIYDNNNNI
  66 69 72 75
  69 72

121 TDQPI
...

5 matches found in sequence:
ha33cloblo ; Main hemagglutinin component (HA 33 kDa subunit).
(from "bt sp.pep")
TOIG of: ha33_cloblo check: 7829 from: 1 to: 285

ID HA33 CLOBO STANDARD; PRT; 285 AA.
AC P46084;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-FEB-1996 (Rel. 33, Last sequence update)
DT 16-OCT-2001 (Rel. 40, Last annotation update)
DE Main hemagglutinin component (HA 33 kDa subunit).
DE HA-33 OR ANTP-33.
GN Clostridium botulinum.
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A., AND PARTIAL SEQUENCE.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=90382931; PubMed=2205574;
RA Tsuzuki K., Kimura K., Fujii N., Yokosawa N., Indoh T.,
RA Murakami T., Oguma K.;
RT "Cloning and complete nucleotide sequence of the gene for the main
RT component of hemagglutinin produced by Clostridium botulinum type
RT C.";
RL Infect. Immun. 58:3173-3177(1990).
RN [2]
RP SEQUENCE OF 268-285 FROM N.A.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=95100958; PubMed=7802661;
RA Fujinaga Y., Inoue K., Shimazaki S., Tomochika K., Tsuzuki K.,
RA Fujii N., Watanabe T., Ohyama T., Takeshi K., Inoue K., Oguma K.;
RT toxin and its gene organization.";
RT "Molecular construction of Clostridium botulinum type C progenitor
RT Clostridium botulinum."
RL Biochem. Biophys. Res. Commun. 205:1291-1298(1994).
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC -1- SIMILARITY: Contains 2 ricin B-type lectin domains.
CC
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CC
CC EMBL; X62389; CAA44261.1; -.
CC EMBL; X53041; CAA37210.1; -.

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DR EMBL; S74768; AAB32847.1; -.
DR InterPro; IPR000772; Ricin B lectin.
DR InterPro; IPR008997; RicinB_Like.
DR Pfam; PF00652; Ricin_B_lectin; 6.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS0231; RICIN_B_LECTIN; 2.
KW Hemagglutinin; Lectin; Repeat.
FT DOMAIN 11 139 RICIN B-TYPE LECTIN 1.
FT DOMAIN 179 283 RICIN B-TYPE LECTIN 2.
SQ SEQUENCE 285 AA; 33621 MW; C016733591A29C4B CRC64;

HA33 CLOBO Length: 285 September 1, 2004 07:06 Type: P Check: 7829
Found using 'seq23' (hayes346.key)
...

41 SGANQKRLIYDYNKQAYKIKVMDNTSLITWNPAPLSSVSVKTDNGDNGYWLQNYIS
  91 94
  |--|
  |---|
  |---|
  143

101 RNVIRNMPNLVLQYNIDDTLMVSTQTSSNQFFKFSNCIYEALANRNCKLTQLNSD
  229 242
  |---|
  |---|
  206

161 RFLSKNLNSQIIVLQWFDSSRQKWIIEYNETKSAYTLKQENNRILTQNSNNYVETY
  229 242
  |---|
  |---|
  206

221 QSTDLSIQYWNINYLNDNDASKYILYNLQDTRVLDVNSQIANGTHVIVDSYHGNTNQOW
  229 242
  |---|
  |---|
  206

281 IINLI

-----
19 matches found in sequence:
ha70cloblo ; Hemagglutinin components HA-53 and HA-22/23 precursor.
(from "bt sp.pep")
TOIG of: ha70_cloblo check: 5580 from: 1 to: 623

ID HA70 CLOBO STANDARD; PRT; 623 AA.
AC P46085;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-NOV-1995 (Rel. 32, Last sequence update)
DT 15-DEC-1998 (Rel. 37, Last annotation update)
DE Hemagglutinin components HA-53 and HA-22/23 precursor.
DE HA-70 OR ANTP-70.
GN Clostridium botulinum.
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 7-29 AND 193-212.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "organization of the botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C 468.";
RL Mol. Gen. Genet. 243:631-640(1994).
CC -1- SUBUNIT: HA IS COMPOSED OF SUBCOMPONENTS HAVING 53, 33, 22-23, AND
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC
CC SEQUENCE FROM N.A.
CC STRAIN=Type C Stockholm / C-ST / 468;
CC MEDLINE=94301293; PubMed=8028579;
CC Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
CC "organization of the botulinum neurotoxin C1 gene and its associated
CC non-toxic protein genes in Clostridium botulinum C 468.";
CC Mol. Gen. Genet. 243:631-640(1994).
CC -1- SUBUNIT: HA IS COMPOSED OF SUBCOMPONENTS HAVING 53, 33, 22-23, AND
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC

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CC -----
DR EMBL; D38562; BAA07575.1; -
DR EMBL; S74768; AAB32849.1; -
DR EMBL; X72793; CAA51309.1; -
DR InterPro; IPR003897; Clienterotox.
DR Pfam; PF03505; Clienterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
KW Hemagglutinin.
FT CHAIN 7 192 HEMAGGLUTININ COMPONENT HA-23A
FT (POTENTIAL).
FT CHAIN 10 192 HEMAGGLUTININ COMPONENT HA-23B
FT (POTENTIAL).
FT CHAIN 13 192 HEMAGGLUTININ COMPONENT HA-22A
FT (POTENTIAL).
FT CHAIN 15 192 HEMAGGLUTININ COMPONENT HA-22B
FT (POTENTIAL).
FT CHAIN 193 623 HEMAGGLUTININ COMPONENT HA-53.
FT SEQUENCE 623 AA; 70649 MW; 115FBF1B2F3FB667 CRC64;
SQ
HA70_CLOBO Length: 623 September 1, 2004 07:06 Type: P Check: 5580
Found using 'seq23' (hayes346.key)
...
20 NLADGNVYVNRGDGWLRSQNLQGNISNNGCTAIVGLRIRRETATPYPTAFNEFY
70 73
114 119 124
116 121
179
80 IKNNVQVNFANFTEASEIPGFEKSTAPSKNSLYQYVIRVEIHKVLQWTVTERAV
114 119 124
116 121
179
140 LYVPSLGVYKSTFESEBQIDKNFYFTSQDKILNEKFIYKIDDTITVKESKNSNNIN
179
200 FNTSQITLPPNGLYVINKDGMRTNDKDLICTLLIESSTSGSIIPRLNTRPLFNT
260 SNPTTFSEYTEARLNDAPNIQLFNTSTTLFKFVEEAPNKNISMVKYNTYKYLINYO
269 307 313
310
320 NGNIDDKAEYVLPGLKCEVSDAPSPQAPVVEPVDQDGFQIGPNENIIVGVPSENI
380 BEISTPIPDYTYNIPTSIQNNACKYVFKVNTGVYKVIITKNNLPLLIYEAGSSNRNM
404 429
440 NSNNLSNDNIKAIVITGLNRSDAKSLVLSFKQKNYVIRIPIQISSSTTSQLIKFKEIG
466 478
500 NISDLADSTVNILDNLTSGTHYTRQSPDVGNIYSYQLTIPGDFNNIASSIFSPFRNN
533
560 QGIGTLRLTESINGNLTATNNISDNLNNVEPISLLNGATVIFRVKVTALNNYIFDA
575 583
620 YRNS

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```

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1 match found in sequence:
rac1cavpo ; Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Sigma 1
(from "bt.sp.pep"))
TOIG of: rac1_cavpo check: 9541 from: 1 to: 77
ID RAC1_CAVPO STANDARD; PRT; 77 AA.
AC P80236; Q9QUV9;
DT 01-OCT-1993 (Rel. 27, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 16-OCT-2001 (Rel. 40, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Sigma 1
component protein p22) (fragment).
DE GN RAC1.
OS Cavia porcellus (Guinea pig).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Rodentia; Hystricognathi; Caviidae; Cavia.
OX NCBI_TaxID=10141;
RN [1]
RP SEQUENCE OF 1-69.
RX MEDLINE=92018254; PubMed=1922386;
RA Abo A., Pick E., Hall A., Totty N., Teahan C.G., Segal A.W.;
RT "Activation of the NADPH oxidase involves the small GTP-binding
protein p21rac1.";
RL Nature 353:668-670(1991).
RN [2]
RP SEQUENCE OF 1-22; 39-53 AND 60-77.
RC STRAIN=Hartley; TISSUE=Macrophage;
RX MEDLINE=94039069; PubMed=8223583;
RA Pick E., Gorzalczyk Y., Engel S.;
RT "Role of the rac1 p21-GDP-dissociation inhibitor for rho heterodimer
in the activation of the superoxide-forming NADPH oxidase of
macrophages.";
RL Eur. J. Biochem. 217:441-455(1993).
CC -!- FUNCTION: Rac1 p21/rho GDI heterodimer is the active component of
the cytosolic factor sigma 1, which is involved in stimulation of
the NADPH oxidase activity in macrophages.
CC -!- SUBUNIT: Forms a heterodimer with rho-GDI.
CC -!- SUBCELLULAR LOCATION: Cytoplasmic and membrane-bound.
CC -!- PTM: The N-terminus is blocked.
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
DR PIR; S38767; S38767.
DR HSP; P15154; 1MH1.
DR InterPro; IPR001806; Ras_trnsfrmng.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTRNSFRMNG.
KW GTP-binding.
FT NON_TER 1 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8810 MW; 8858AB9FAA15F8BF CRC64;
RAC1_CAVPO Length: 77 September 1, 2004 07:06 Type: P Check: 9541
Found using 'seq23' (hayes346.key)

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1 AKWYEVHRHCNPTPIILVGTKLRLDRDKDTIEKLKEKLTPTITPQGLAMAKEIGA
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2 matches found in sequence:
rac1human ; Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Ras-like
(from "bt.sp.pep"))
TOIG of: rac1_human check: 7938 from: 1 to: 192
ID RAC1_HUMAN STANDARD; PRT; 192 AA.
AC P15154; O95501; Q9BTE4;
DT 01-APR-1990 (Rel. 14, Created)
DT 01-APR-1990 (Rel. 14, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Ras-like

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RX MEDLINE=95403450; PubMed=7673236;
 RA Jullien-Floures V., Dorseuil O., Romero F., Letourneur F.,
 RA Saragosi S., Berger K., Ravittan A., Gacon G., Camonis J.H.;
 RT "Erdging Ral GTPase to Rho pathways. RLIP76, a Ral effector with
 RT CDC42/Rac GTPase-activating protein activity.";
 RL J. Biol. Chem. 270:22473-22477(1995).
 RN [15]
 RP INTERACTION WITH DOCK2.
 RX MEDLINE=20025468; PubMed=10559471;
 RA Nishihara H., Kobayashi S., Hashimoto Y., Ohba F., Mochizuki N.,
 RA Kurata T., Nagashima K., Matsuda M.;
 RT "Non-adherent cell-specific expression of DOCK2, a member of the human
 RT CDM-family proteins.";
 RL Biochim. Biophys. Acta 1452:179-187(1999).
 RN [16]
 RP INTERACTION WITH PARD6A, AND MUTAGENESIS OF GLN-61.
 RX SPECIES=Human;
 RC MEDLINE=20411249; PubMed=10954424;
 RA Johansson A.-S., Driessens M., Aspenstroem P.;
 RT "The mammalian homologue of the Caenorhabditis elegans polarity
 RT protein PAR-6 is a binding partner for the Rho GTPases Cdc42 and
 RT Rac1.";
 RL J. Cell Sci. 113:3267-3275(2000).
 RN [17]
 RP INTERACTION WITH PARD6A; PARD6B AND PARD6G; PRKCI AND PRKCZ, AND
 RP MUTAGENESIS OF GLY-12 AND THR-17.
 RX SPECIES=Human;
 RC MEDLINE=21160560; PubMed=11260256;
 RA Noda Y., Takeya K., Ohno S., Naito S., Ito T., Sumimoto H.;
 RT "Human homologues of the Caenorhabditis elegans cell polarity protein
 RT PAR6 as an adaptor that links the small GTPases Rac and Cdc42 to
 RT atypical protein kinase C.";
 RL Genes Cells 6:107-119(2001).
 RN [18]
 RP INTERACTION WITH PARD6A, AND MUTAGENESIS OF GLY-12.
 RX SPECIES=Mouse;
 RC MEDLINE=20394296; PubMed=10934474;
 RA Joberty G., Petersen C., Gao L., Macara I.G.;
 RT "The cell-polarity protein Par6 links Par3 and atypical protein kinase
 RT C to Cdc42.";
 RL Nat. Cell Biol. 2:531-539(2000).
 RN [19]
 RP INTERACTION WITH PARD6B.
 RX SPECIES=Mouse;
 RC MEDLINE=20394297; PubMed=10934475;
 RA Lin D., Edwards A.S., Fawcett J.P., Mbamalu G., Scott J.D., Pawson T.;
 RT "A mammalian PAR-3-PAR-6 complex implicated in Cdc42/Rac1 and APKC
 RT signalling and cell polarity.";
 RL Nat. Cell Biol. 2:540-547(2000).
 RN [20]
 RP ACTIVATION BY PREX1.
 RX SPECIES=Human;
 RC MEDLINE=21952478; PubMed=11955434;
 RA Welch H.C.E., Coadwell W.J., Ellison C.D., Ferguson G.J., Andrews S.R.,
 RA Erdjument-Bromage H., Tempst P., Hawkins P.T., Stephens L.R.;
 RT "P-Rex1, a Ptdins(3,4,5)P3- and Gbetagamma-regulated guanine-nucleotide
 RT exchange factor for Rac.";
 RL Cell 108:809-821(2002).
 RN [21]
 RP SUBUNIT OF A COMPLEX CONTAINING ELMO1 AND DOCK1.
 RX SPECIES=Human;
 RC MEDLINE=22144530; PubMed=12134158;
 RA Brugnara E., Hanev L., Grimsley C., Lu M., Walk S.F.,
 RA Tosello-Tramont A.-C., Macara I.G., Madhani H., Fink G.R.,
 RA Ravichandran K.S.;
 RT "Unconventional Rac-GEF activity is mediated through the Dock180-ELMO
 RT complex.";
 RL Nat. Cell Biol. 4:574-582(2002).
 RN [22]
 RP X-RAY CRYSTALLOGRAPHY (1.38 ANGSTROMS) OF 1-184.
 RX SPECIES=Human;
 RC MEDLINE=97185915; PubMed=9033596;
 RA Hirshberg M., Stockley R.W., Dodson G., Webb M.R.;
 RT "The crystal structure of human rac1, a member of the rho-family
 RT complexed with a GTP analogue.";
 RL Nat. Struct. Biol. 4:147-152(1997).
 RN [23]
 RP X-RAY CRYSTALLOGRAPHY (2.4 ANGSTROMS) OF COMPLEX WITH NCF2.
 RX SPECIES=Human;
 RC MEDLINE=21000498; PubMed=11090627;
 RA Lapouge K., Smith S.J., Walker P.A., Gamblin S.J., Smerdon S.J.,
 RA Rittinger K.;
 RT "Structure of the TPR domain of p67phox in complex with Rac.GTP.";
 RL Mol. Cell 6:899-907(2000).
 RN [24]
 RP X-RAY CRYSTALLOGRAPHY (2.8 ANGSTROMS) OF 1-177 IN COMPLEX WITH TIAMI.
 RX SPECIES=Human;
 RC MEDLINE=21012003; PubMed=11130063;
 RA Worthylake D.K., Rossmann K.L., Sondek J.;
 RT "Crystal structure of Rac1 in complex with the guanine nucleotide
 RT exchange region of Tiami.";
 RL Nature 408:682-688(2000).
 RN [25]
 RP X-RAY CRYSTALLOGRAPHY (2.3 ANGSTROMS) OF 1-184.
 RX SPECIES=Human;
 RC MEDLINE=21111053; PubMed=11163217;
 RA Stebbins C.E., Galan J.E.;
 RT "Modulation of host signaling by a bacterial mimic: structure of the
 RT Salmonella effector Sptp bound to Rac1.";
 RL Mol. Cell 6:1449-1460(2000).
 RN [26]
 RP X-RAY CRYSTALLOGRAPHY (2.0 ANGSTROMS) OF 1-176.
 RX SPECIES=Human;
 RC MEDLINE=20577269; PubMed=11135665;
 RA Wurtele M., Wolf E., Pederson K.J., Buchwald G., Ahmadian M.R.,
 RA Barbieri J.T., Wittinghofer A.;
 RT "How the Pseudomonas aeruginosa ExoS toxin downregulates Rac.";
 RL Nat. Struct. Biol. 8:23-26(2001).
 RN [27]
 RP X-RAY CRYSTALLOGRAPHY (2.7 ANGSTROMS) IN COMPLEX WITH ARHGDI.
 RX SPECIES=Human;
 RC MEDLINE=21404971; PubMed=11513578;
 RA Grizot S., Faure J., Fieschi F., Vignais P.V., Dagher M.C.,
 RA Pebay-Peyroula E.;
 RT "Crystall structure of the Rac1-RhoGDI complex involved in naph
 RT oxidase activation.";
 RL Biochemistry 40:10007-10013(2001).
 RN [28]
 RP X-RAY CRYSTALLOGRAPHY (2.5 ANGSTROMS) IN COMPLEX WITH ARFIP2.
 RX SPECIES=Human;
 RC MEDLINE=21244534; PubMed=11346801;
 RA Tarricone C., Xiao B., Justin N., Walker P.A., Rittinger K.,
 RA Gamblin S.J., Smerdon S.J.;
 RT "The structural basis of Arfapin-mediated cross-talk between Rac and
 RT Arf signalling pathways.";
 RL Nature 411:215-219(2001).
 RN [29]
 RP FUNCTION: Plasma membrane-associated small GTPase which cycles
 CC between an active GTP-bound and inactive GDP-bound state. In active
 CC state binds to a variety of effector proteins to regulate cellular
 CC responses, such as secretory processes, phagocytosis of apoptotic
 CC cells and epithelial cell polarization.
 CC -! ENZYME REGULATION: Regulated by guanine nucleotide exchange
 CC factors (GEFs) which promote the exchange of bound GDP for free
 CC GTP, GTPase activating proteins (GAPs) which increase the GTP
 CC hydrolysis activity, and GDP dissociation inhibitors which
 CC inhibit the dissociation of the nucleotide from the GTPase.
 CC -! SUBUNIT: Interacts with the GEF proteins PREX1, DOCK1 and DOCK2,
 CC which promote the exchange between GDP and GTP, and therefore
 CC activate it. Interacts with PARD6A, PARD6B and PARD6G in a GTP-
 CC dependent manner. Part of a quaternary complex containing PARD3,
 CC some PARD6 protein (PARD6A, PARD6B or PARD6G) and some atypical
 CC PKC protein (PRKCI or PRKCZ), which plays a central role in
 CC epithelial cell polarization. Found in a trimeric complex composed
 CC of DOCK1 and ELMO1, which plays a central role in phagocytosis of
 CC apoptotic cells. Interacts with RALBP1 via its effector
 CC domain.


```

74 QTDVFLICFSLVSPASFNVRKWPVETVRHHCPNTPPIILVGTKLDRDDKOTIEKLKEKK
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    98 101
134 LTPITYPQGLAWAKEIGA
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    98 101
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2 matches found in sequence:
rac2bovin ; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
(from "bt_sp.pep")
TOIG of: rac2_bovin check: 9020 from: 1 to: 192

ID RAC2_BOVIN STANDARD; PRT; 192 AA.
AC Q9TU25;
DT 16-OCT-2001 (Rel. 40, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
GN RAC2.
OS Bos taurus (Bovine).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Cetartiodactyla; Ruminantia; Pecora; Bovoidea;
OC Bovidae; Bovinae; Bos.
OX NCBI_TaxID=9913;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=20264070; PubMed=10802295;
RA Davis A.R., Clements M.K., Burger P.L., Siemsen D.W., Quinn M.T.;
RT "Cloning of bovine low molecular weight GTPases (Rac1 and Rac2) and
RL Rho GTP-dissociation inhibitor 2 (D4-GDI).";
CC Vet. Immunol. Immunopathol. 74:285-301(2000).
CC -!- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NADPH oxidase (By similarity).
CC -!- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP. GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GDP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -!- SUBUNIT: Interacts with DOCK2, which may activate it (By
CC similarity).
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
CC -----
CC This SWISS-PROT entry is copyright. It is produced through a collaboration
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CC -----
CC DR EMBL; AF175263; AAF00715.1; -.
CC DR HSSP; P15153; 1DS6.
CC DR InterPro; IPR003578; GTPase Rho.
CC DR InterPro; IPR001806; Ras trnsfrmg.
CC DR InterPro; IPR005225; Small_GTP.
CC DR Pfam; PF00071; ras; 1.
CC DR PRINTS; PR00449; RASPRNGRFGNG.
CC DR SMART; SM00174; RHO; 1.
CC DR TIGRFAMs; TIGR00231; small GTP; 1.
KW GTP-binding; Prenylation; small GTP; 1.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine
...
FT SQ SEQUENCE 192 AA; 21424 MW; 2B5D6266AAC3210 CRC64;
    (By similarity)
RAC2_BOVIN Length: 192 September 1, 2004 07:06 Type: P Check: 9020
Found using 'seq23' (hayes346.key)
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14 VGKTCLLISYTTNAPFGEYIPTVFDNYSANVMVDSKPVNLGLWDTAGQEDYDRLRPLSYSP
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    64 67
74 QTDVFLICFSLVSPASFNVRKWPVETVRHHCPNTPPIILVGTKLDRDDKOTIEKLKEKK
    |--|
    90 93
134 LAPITYPQGL
    |--|
    90 93
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3 matches found in sequence:
rac2cavpo ; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
(from "bt_sp.pep")
TOIG of: rac2_cavpo check: 9059 from: 1 to: 192

ID RAC2_CAVPO STANDARD; PRT; 192 AA.
AC O88931;
DT 16-OCT-2001 (Rel. 40, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
GN RAC2.
OS Cavia porcellus (Guinea pig).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Rodentia; Hystricognathi; Caviidae; Cavia.
OX NCBI_TaxID=10141;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=Dunkin-Hartley;
RX MEDLINE=20010089; PubMed=10540223;
RA Lacy P., Mahmudi-Azer S., Bablitz B., Gilchrist M., Fitzharris P.,
RA Cheng D., Man S.F.P., Bokoch G.M., Moqbel R.;
RT "Expression and translocation of Rac2 in eosinophils during
RT superoxide generation.";
RL Immunology 98:244-252(1999).
CC -!- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NADPH oxidase (By similarity).
CC -!- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP. GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GDP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -!- SUBUNIT: Interacts with DOCK2, which may activate it (By
CC similarity).
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
CC -----
CC This SWISS-PROT entry is copyright. It is produced through a collaboration
CC between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC the European Bioinformatics Institute. There are no restrictions on its
CC use by non-profit institutions as long as its content is in no way
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CC entities requires a license agreement (See http://www.isb-sib.ch/announce/
CC or send an email to license@isb-sib.ch).
CC -----
CC DR EMBL; AF085341; AAC35359.1; -.
CC DR HSSP; P15153; 1DS6.
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DR InterPro; IPR003578; GTPase_Rho.
DR InterPro; IPR001806; Ras trnsfrmg.
DR InterPro; IPR005225; Small_GTP.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTRNSFRMG.
DR SMART; SM00174; RHO; 1.
DR TIGRFAMS; TIGR00231; small_GTP; 1.
KW GTP-binding; Prenylation; Lipoprotein.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-Geranylgeranyl cysteine
(By similarity).
SQ SEQUENCE 192 AA; 21408 MW; 2AE790A32A1BD986 CRC64;
RAC2 CAVPO Length: 192 September 1, 2004 07:06 Type: P Check: 9059
Found using 'seq23' (hayes346.key)
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14 VGKTCLLISYTTNAFFGEYIPTVFDNYSANVMWDSKPVNLGLMDTAGQEDYDRRLPSYP
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64 67
74 QTDVFLICFLSPASVENHANYKVRHCHPSTPIILGTLKLDLRDDKETIEKLKEKK
[---] [---]
90 93 98 101
134 LAPITYPQGLALAKEIDS
...
2 matches found in sequence:
rac2human; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (Small G
(from "bt.sp.pep")
TOIG of: rac2_human check: 8838 from: 1 to: 192
ID RAC2_HUMAN STANDARD; PRT; 192 AA.
AC R15153;
DT 01-APR-1990 (Rel. 14, Created)
DT 01-APR-1990 (Rel. 14, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (Small G
DE protein) (GX).
GN RAC2.
OS Homo sapiens (Human).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=89380250; PubMed=2674130;
RA Didsbury J., Weber R.F., Bokoch G.M., Evans T., Snyderman R.;
RT "Rac, a novel ras-related family of proteins that are botulinum toxin
RT substrates.";
RL J. Biol. Chem. 264:16378-16382 (1989).
RN [2]
RP SEQUENCE FROM N.A.
RA Fuhr H.L. III, Ikeda S.R., Aronstam R.S.;
RT "cDNA clones of human proteins involved in signal transduction
RT sequenced by the Guthrie cDNA resource center (www.cdna.org).";
RL Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RX MEDLINE=200571165; PubMed=10591208;
RA Dunham I., Hunt A.R., Collins J.E., Bruskiewicz R., Beare D.M.,
RA Clamp M., Smink L.J., Ainscough R., Almeida J.P., Babbage A.K.,
RA Bagguley C., Bailey J., Barlow K.F., Bates K.N., Beasley O.P.,
RA Bird C.P., Blakey S.E., Bridgeman A.M., Buck D., Burgess J.,
RA Burrill W.D., Burton J., Carder C., Carter N.P., Chen Y., Clark G.,
RA Clegg S.N., Cobley V.E., Cole C.G., Collier R.E., Connor R.,

Conroy D., Corby N.R., Coville G.J., Cox A.V., Davis J., Dawson E.,
Dhami P.D., Dockree C., Dodsworth S.J., Durbin R.M., Ellington A.G.,
Evans K.L., Fey J.M., Fleming K., French L., Garner A.A., Hall C.,
RA Gilbert J.G.R., Goward M.E., Graffham D.V., Griffiths M.N.D., Hall C.,
RA Hall R.E., Hall-Tamlyn G., Heathcott R.W., Ho S., Holmes S.,
RA Hunt S.E., Jones M.C., Kershaw J., Kimberley A.M., King A.,
RA Laird G.K., Langford C.F., Leversha M.A., Lloyd C., Lloyd D.M.,
RA Martyn I.D., Mashreghi-Mohammadi M., Matthews L.H., McCann O.T.,
RA Mcclay J., McLaren S., McMurray A.A., Milne S.A., Mortimore B.J.,
RA Odell C.N., Pavitt R., Pearce A.V., Pearson D., Phillips B.C.T.,
RA Phillips S.H., Plumb R.W., Ramsey H., Ramsey Y., Rogers L., Ross M.T.,
RA Scott C.E., Sehra H.K., Skuce C.D., Smalley S., Smith M.L.,
RA Soderlund C., Spraggon L., Steward C.A., Sulston J.E., Swann R.M.,
RA Vaudin M., Wall M., Wallis J.M., Whiteley M.N., Willey D.L.,
RA Williams L., Williams S.A., Williamson H., Wilmer T.E., Wilming L.,
RA Wright C.L., Hubbard T., Bentley D.R., Beck S., Rogers J., Shimizu N.,
RA Minoshima S., Kawasaki K., Sasaki T., Asakawa S., Kudoh J.,
RA Shintani A., Shibuya K., Yoshizaki Y., Aoki N., Mitsuyama S.,
RA Roe B.A., Chen F., Chu L., Crabtree J., Deschamps S., Do A., Do T.,
RA Dorman A., Fang F., Fu Y., Hu P., Hua A., Kenton S., Lai H., Lao H.I.,
RA Lewis J., Lewis S., Lin S.-P., Loh P., Malaj E., Nguyen T., Pan H.,
RA Phan S., Qi S., Qian Y., Ray L., Ren Q., Shauli S., Sloan D., Song L.,
RA Wang Q., Wang Y., Wang Z., White J., Willingham D., Wu H., Yao Z.,
RA Zhan M., Zhang G., Chisoe S., Murray J., Miller N., Minx P.,
RA Fulton R., Johnson D., Bemis G., Bentley D., Bradshaw H., Bourne S.,
RA Cordes M., Du Z., Fulton L., Goela D., Graves T., Hawkins J.,
RA Hinds K., Kemp K., Latreille P., Layman D., Ozersky P., Rohlfing T.,
RA Scheet P., Walker C., Wamsley A., Wohldmann P., Pepin K., Nelson J.,
RA Korf I., Bedell J.A., Hillier L.W., Mardis E., Waterston R.,
RA Wilson R., Emanuel B.S., Shaikh T., Kurahashi H., Saitta S.,
RA Budarf M.L., McDermid H.E., Johnson A., Wong A.C.C., Morrow B.E.,
RA Edelmann L., Kim U.J., Shizuya H., Simon M.I., Dumanski J.P.,
RA Peyrard M., Kedra D., Seroussi E., Fransson I., Tapia I., Bruder C.E.,
RA O'Brien K.P., Wilkinson P., Bodenteich A., Hartman K., Hu X.,
RA Khan A.S., Lane L., Tiliahun Y., Wright H.;
RT "The DNA sequence of human chromosome 22.";
RL Nature 402:489-495 (1999).
RN [4]
RP SEQUENCE FROM N.A.
RC TISSUE=Brain;
RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,
RA Altschul S.P., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Scapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
RA Brownstein M.J., Ustin T.B., Toshiyuki S., Carninci P., Prange C.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullaly S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahey J., Helton E., Kettelman M., Madan A., Rodrigues S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.C., Touchman J.W., Green E.D., Dickson M.C.,
RA Rodriguez A.W., Grimwood J., Schmutz J., Myers R.M.,
RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smailus D.E.,
RA Schnurch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences.";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903 (2002).
RN [5]
RP SEQUENCE OF 13-192 FROM N.A.
RX MEDLINE=91207334; PubMed=1902092;
RA Reibel L., Dorseuil O., Stancou R., Bertoglio J., Gacon G.;
RT "A hemopoietic specific gene encoding a small GTP binding protein is
RT overexpressed during T cell activation.";
RL Biochem. Biophys. Res. Commun. 175:451-458 (1991).
RN [6]
RP SEQUENCE OF 6-15; 97-107 AND 134-165.
RX MEDLINE=92268051; PubMed=1316893;
RA Mizuno T., Kailuchi K., Ando S., Masha T., Hiraoka K., Takeishi K.,
RA Asada M., Nunoi H., Matsuda I., Takai Y.;

RT "Regulation of the superoxide-generating NADPH oxidase by a small
 RT GTP-binding protein and its stimulatory and inhibitory GDP/GTP
 RL J. Biol. Chem. 267:10215-10218(1992).
 RN [7]
 RN INTERACTION WITH DOCK2.
 RX MEDLINE=20025468; PubMed=10559471;
 RA Nishihara H., Kobayashi S., Hashimoto Y., Ohba F., Mochizuki N.,
 RA Kurata T., Nagashima K., Matsuda M.;
 RT "Non-adherent cell-specific expression of DOCK2, a member of the human
 RT CDM-family proteins.";
 RL Biochim. Biophys. Acta 1452:179-187(1999).
 RN [8]
 RN ISOPRENOID.
 RX MEDLINE=91236758; PubMed=1903399;
 RA Kinsella B.T., Erdman R.A., Maltese W.A.;
 RT "Carboxyl-terminal isoprenylation of ras-related GTP-binding proteins
 RT encoded by rac1, rac2, and rala.";
 RL J. Biol. Chem. 266:9786-9794(1991).
 RN [9]
 RN X-RAY CRYSTALLOGRAPHY (2.35 ANGSTROMS) OF COMPLEX WITH ARHGDI1B.
 RX MEDLINE=2012627; PubMed=10655614;
 RA Scheffzek K., Stephan I., Jensen O.N., Illenberger D., Gierschik P.;
 RT "The Rac-RhoGDI complex and the structural basis for the regulation
 RT of Rho proteins by RhoGDI.";
 RL Nat. Struct. Biol. 7:122-126(2000).
 CC -!- FUNCTION: Plasma membrane-associated small GTPase which cycles
 CC between an active GTP-bound and inactive GDP-bound state. In active
 CC state binds to a variety of effector proteins to regulate cellular
 CC responses, such as secretory processes, phagocytosis of apoptotic
 CC cells and epithelial cell polarization. Seems to be involved in
 CC the regulation of the NADPH oxidase.
 CC -!- ENZYME REGULATION: Regulated by guanine nucleotide exchange
 CC factors (GEFs) which promote the exchange of bound GDP for free
 CC GTP, GTPase activating proteins (GAPs) which increase the GTP
 CC hydrolysis activity, and GTP dissociation inhibitors which
 CC inhibit the dissociation of the nucleotide from the GTPase.
 CC -!- SUBUNIT: Interacts with DOCK2, which may activate it.
 CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
 CC activated.
 CC -!- TISSUE SPECIFICITY: Hematopoietic specific.
 CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
 CC -----
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 CC -----
 DR EMBL; M29871; AAA36538.1; -;
 DR EMBL; AF498965; AAM21112.1; -;
 DR EMBL; Z82188; CAB45265.1; -;
 DR EMBL; BC001485; AAH01485.1; -;
 DR EMBL; M64595; AAA35941.1; -;
 DR PIR; B34386; B34386.
 DR PDB; 1DS6; 19-JUL-00.
 DR Genew; HGNC:9802; RAC2.
 DR MIM; 602049; -;
 DR GO; GO:0003924; F:GTPase activity; TAS.
 DR GO; GO:0007165; P:signal transduction; TAS.
 DR InterPro; IPR003578; GTPase.Rho.
 DR InterPro; IPR001806; Ras trnsfrmg.
 DR InterPro; IPR005225; Small_GTP.
 DR Pfam; PF00071; ras; 1.
 DR PRINTS; PR00449; RASRNSFRMG.
 DR SMART; SM00174; RHO; 1.
 DR TIGRFAIMS; TIGR00231; small_GTP; 1.
 KW GTP-binding; Prenylation; Lipoprotein; 3D-structure.
 FT NP_BIND 10 17 GTP (BY SIMILARITY).
 FT NP_BIND 57 61 GTP (BY SIMILARITY).
 FT NP_BIND 115 118 GTP (BY SIMILARITY).

FT EFFECTOR REGION (POTENTIAL).
 FT S-geranylgeranyl cysteine.

FT DOMAIN 32 40
 FT LIPID 189 189
 FT STRAND 2 10
 FT TURN 12 13
 FT HELIX 16 25
 FT STRAND 40 45
 FT STRAND 50 56
 FT HELIX 62 64
 FT TURN 65 67
 FT HELIX 68 71
 FT TURN 73 74
 FT STRAND 77 83
 FT TURN 84 85
 FT HELIX 87 95
 FT TURN 96 96
 FT HELIX 97 104
 FT TURN 106 107
 FT STRAND 110 115
 FT HELIX 117 119
 FT TURN 120 121
 FT HELIX 123 131
 FT TURN 132 133
 FT HELIX 139 148
 FT TURN 149 150
 FT STRAND 153 156
 FT TURN 159 161
 FT TURN 163 164
 FT HELIX 165 177
 SQ SEQUENCE 192 AA; 21429 MW; 2A1F1366B07C3210 CRC64;

RAC2 HUMAN Length: 192 September 1, 2004 07:06 Type: P Check: 8838 ..
 Found using 'seq23' (hayes346.key)

...

14 VKTKLLISYTTNAPGEVPTVFDNYSANVMWDSKPNVLGLWDTAGQEDYDLRLPLSY
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 64 67

74 QTFDFLFCFLSPASVYENRAKWPFEVRHHCPSTPIILVGTKLDRDDKDTIKLKEKK
 |---|
 90 93

134 LAPITYPQGL

...

 2 matches found in sequence:
 rac2mouse ; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (EN-7 protei
 (from "Bt_sp.pep")

TOIG of: rac2_mouse check: 9059 from: 1 to: 192

ID RAC2_MOUSE STANDARD; PRT; 192 AA.

AC Q05144; Q0D8X9;

DT 01-FEB-1994 (Rel. 28, Created)

DT 01-FEB-1994 (Rel. 28, Last sequence update)

DT 15-MAR-2004 (Rel. 43, Last annotation update)

DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (EN-7 protein).
 GN RAC2.

OS Mus musculus (Mouse).

OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;

OC Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

OX NCBI TaxID=10090;

RN [1]

RP SEQUENCE FROM N.A.

RX MEDLINE=90265620; PubMed=2189110;

RA Shirsat N.V., Pignolo R.J., Kreider B.L., Rovera G.;

RT "A member of the ras gene superfamily is expressed specifically in T,

RT B and myeloid hemopoietic cells.";

RL Oncogene 5:769-772(1990).

RN [2]

RP SEQUENCE FROM N.A.

RC STRAIN=C57BL/6J; TISSUE=Pancreas;
RX MEDLINE=21085660; PubMed=11217851;
RA Kawai J., Shinagawa A., Shibata K., Yoshino M., Itoh M., Ishii Y.,
RA Arakawa T., Hara A., Fukunishi Y., Konno H., Adachi J., Fukuda S.,
RA Aizawa K., Izawa M., Nishi K., Kiyosawa H., Kondo S., Yamanaka I.,
RA Saito T., Okazaki Y., Gojobori T., Bono H., Kasukawa T., Saito R.,
RA Kadota K., Matsuda H.A., Ashburner M., Batalov S., Casavant T.,
RA Fleischmann W., Gaasterland T., Gissi C., King B., Kochiwa H.,
RA Kuehl P., Lewis S., Matsuo Y., Nikaide I., Pesole G., Quackenbush J.,
RA Schiraldi L.M., Staabli F., Suzuki R., Tomita M., Wagner L., Washio T.,
RA Sakai K., Okido T., Furuno M., Aono H., Baldarelli R., Barsh G.,
RA Blake J., Boffelli D., Bojunga N., Carninci P., de Bonaldo M.F.,
RA Brownstein M.J., Bult C., Fletcher C., Fujita M., Gariboldi M.,
RA Gystincich S., Hill D., Hofmann M., Hume D.A., Kamiya M., Lee N.H.,
RA Lyons P., Marchionni L., Mashima J., Mazzarelli J., Mombaerts P.,
RA Nordone P., Ring B., Ringwald M., Rodriguez I., Sakamoto N.,
RA Sasaki H., Sato K., Schoenbach C., Seya T., Shibata Y., Storch K.-F.,
RA Suzuki H., Toyooka K., Wang K.H., Weitz C., Whittaker C., Wilming L.,
RA Wynshaw-Boris A., Yoshida K., Hasegawa Y., Kawaji H., Kohtsuki S.,
RA Hayaishizaki Y.;
RT "Functional annotation of a full-length mouse cDNA collection.";
RL Nature 409:685-690(2001).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=C57BL/6J; TISSUE=Mammary gland;
RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,
RA Altschul S.F., Zeeberg H., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Stapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
RA Brownstein M.J., Usdin T.B., Tohyuki S., Carninci P., Prange C.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullaly S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Vallalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahy J., Helton E., Kettelman M., Madan A., Rodriguez S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
RA Butterfield Y.S.N., Krzyzanski M.I., Skaleka U., Smalhus D.E.,
RA Schnurch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences.";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
CC -1- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NaPPH oxidase.
CC -1- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP. GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GDP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -1- SUBUNIT: Interacts with DOCK2, which may activate it (By
CC similarity).
CC -1- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -1- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC between the Swiss Institute of Bioinformatics and the EMBL outstation -
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; X53247; CAA37337.1; -.
CC EMBL; AK007561; BAB25109.1; -.

DR EMBL; BC005455; AAH05455.1; -.
DR PIR; A60194; A60194.
DR HSP; P15153; 1DS6.
DR MGD; MGI:97846; Rac2.
DR InterPro; IPR003578; GTPase_Rho.
DR InterPro; IPR001806; Ras_trnsmng.
DR InterPro; IPR005225; Small_GTP.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTNSFRMG.
DR SMART; SM00174; RHO; 1.
DR TIGRFAMs; TIGR00231; small GTP; 1.
KW GTP-binding; Prenylation; Lipoprotein.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine
FT (By similarity).
FT CONFLICT 60 60 G -> V (IN REF. 2).
FT SEQUENCE 192 AA; 21441 MW; 2A1F1266AB9D7705 CRC64;
RAC2 MOUSE Length: 192 September 1, 2004 07:06 Type: P Check: 9059
Found using 'seq23' (hayes346.key)
...
14 VGKTCLLISYTNAPGGEIYPTFDNYSANVMVDSKPNVLGLWDTAGQEDYDLRLPLSP
64 57
74 QTDVFLICFSLVSPASVENVRKWFPEVRHHCPSPIILVGTGLDLRDDKDTIEKLEKK
90 93
134 LAPITYPQGL
...

2 matches found in sequence:
Rac_human; Ras-related C3 botulinum toxin substrate 3 (p21-Rac3).
(from "bc_sp.pep")
TOIG of: rac3_human check: 8517 from: 1 to: 192
ID RAC3 HUMAN STANDARD; PRT; 192 AA.
AC O14658;
DT 15-JUL-1998 (Rel. 36, Created)
DT 15-JUL-1998 (Rel. 36, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 3 (p21-Rac3).
GN RAC3.
OS Homo sapiens (Human), and
OS Mus musculus (Mouse),
OS Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606, 10090;
RN [1]
RP SEQUENCE FROM N.A.
RC SPECIES=Human;
RX MEDLINE=97400509; PubMed=9252344;
RA Haataja L., Groffen J., Heisterkamp N.;
RT "Characterization of RAC3, a novel member of the Rho family.";
RL J. Biol. Chem. 272:20384-20388(1997).
RN [2]
RP SEQUENCE FROM N.A.
RC SPECIES=Human;
RA Puhl H.L. III, Ikeda S.R., Aronstam R.S.;
RT "cDNA clones of human proteins involved in signal transduction
RL sequenced by the Guthrie cDNA resource center (www.cdna.org).";
RN Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RC SPECIES=Human; TISSUE=Brain;

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RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wegner L., Shennen C.M., Schuler G.D.,
RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Stapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
RA Brownstein M.J., Usdin T.B., Toshiyuki S., Carninci P., Prange C.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullany S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahey J., Helton E., Kettelman M., Madan A., Rodrigues S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.W., Touchman J.W., Green E.D., Dickinson M.C.,
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smailus D.E.,
RA Scherch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences.";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
RN [4]
RP SEQUENCE FROM N.A.
RC SPECIES=Mouse;
RA Koga H., Sumimoto H.;
RT "mouse Rac3.";
RL Submitted (MAR-2000) to the EMBL/GenBank/DBJ databases.
CC -!- FUNCTION: MAY PLAY A ROLE IN INTRACELLULAR SIGNALING.
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -!- TISSUE SPECIFICITY: HIGHEST LEVELS IN BRAIN, ALSO DETECTED IN
CC HEART, PLACENTA, AND PANCREAS.
CC -!- INDUCTION: EXPRESSION DOWN-REGULATED IN QUIESCENT FIBROBLASTS AND
CC CLEARLY INDUCED BY SERUM STIMULATION.
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC
CC EMBL; AF008591; AAC51667.1; -
CC EMBL; AF498966; AAM21113.1; -
CC EMBL; BC009605; AAH09605.1; -
CC EMBL; BC015197; AAH15197.1; -
CC EMBL; AB040819; BAB40573.1; -
CC HSSP; P15154; 1MHI.
CC Genew; HGNC:9803; Rac3.
CC MIM; 602050; -.
CC MGD; MGI:2180784; Rac3.
CC GO; GO:0003924; GTPase activity; TAS.
CC GO; GO:0007242; P:intracellular signaling cascade; TAS.
CC InterPro; IPR003578; GTPase Rho.
CC InterPro; IPR001806; Ras trnsfrmg.
CC Pfam; PF00071; ras; 1.
CC PRINTS; PR00449; RASTRNSFRMNG.
CC SMART; SM00174; RHO; 1.
CC TIGRfams; TIGR00231; small GTP; 1.
CC GTP-binding; Prenylation; Lipoprotein.
KW NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine
FT VARIANT 14 14 V -> A (in dbSNP:5833).
FT VARIANT 27 27 /FTId=VAR_014551.
FT VARIANT 29 29 A -> T (in dbSNP:5824).
FT VARIANT 29 29 P -> S (in dbSNP:5827).
FT SEQUENCE 192 AA; 21379 MW; 560B8C26B7CDF4A CRC64;

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Found using 'seq23' (hayes346.key)
 Rec3 HUMAN Length: 192 September 1, 2004 07:06 Type: P Check: 8517

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14 VGKTCLLSYTTNAPGPEYIPTVFDNYSANVMVDGKPVNLGLWDTAGQEDYDRLRPLSY
|---|
64 67

74 QTDVFLICFLSPASFPENVRKAYPEVHRHCPTILLVGTGLDLRDDDKDITLERLDDK
|---|
98 101

134 LAPITYQGLAMAREIGS
...

3 matches found in sequence:
racxhuman ; Ras-related C3 botulinum toxin substrate homolog DJ20J23.1.
(from "bt_sp.pep")
TOIG of: racx_human check: 6409 from: 1 to: 192

ID RACX HUMAN STANDARD; PRT; 192 AA.
AC O95916;
DT 16-OCT-2001 (Rel. 40, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Ras-related C3 botulinum toxin substrate homolog DJ20J23.1.
OS Homo sapiens (Human)
OC Eukaryota; Metazoa; Chordata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606;
RN [1]
RP SEQUENCE FROM N.A.
RA Pearce A.;
RL Submitted (JUL-1998) to the EMBL/GenBank/DBJ databases.
CC -!- FUNCTION: RACS ARE PLASMA MEMBRANE-ASSOCIATED GTP-BINDING PROTEINS
CC WHICH COULD REGULATE SECRETORY PROCESSES, PARTICULARLY IN MYELOID
CC CELLS (BY SIMILARITY).
CC -!- SUBCELLULAR LOCATION: Inner surface of plasma membrane possibly
CC with attachment requiring acylation of the C-terminal cysteine (By
CC similarity with RAS).
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; AL022576; -; NOT_ANNOTATED_CDS.
CC HSSP; P15154; 1MHI.
CC InterPro; IPR003578; GTPase Rho.
CC InterPro; IPR001806; Ras trnsfrmg.
CC InterPro; IPR005225; Small_GTP.
CC Pfam; PF00071; ras; 1.
CC PRINTS; PR00449; RASTRNSFRMNG.
CC SMART; SM00174; RHO; 1.
CC TIGRfams; TIGR00231; small GTP; 1.
CC GTP-binding; Prenylation; Lipoprotein; Polymorphism.
KW NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine.
FT VARIANT 14 14 V -> A (in dbSNP:5833).
FT VARIANT 27 27 /FTId=VAR_014551.
FT VARIANT 29 29 A -> T (in dbSNP:5824).
FT VARIANT 29 29 P -> S (in dbSNP:5827).
FT SEQUENCE 192 AA; 21383 MW; 09C5DFE64C8B6053 CRC64;

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RACX HUMAN Length: 192 September 1, 2004 07:06 Type: P Check: 6409 ..
 Found using 'seq23' (hayes346.key)

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14 VGKTCLLISYTTNAFFGEDIPTAFDNYSANVMVDGKLVNGLWNTAGQEDYDRRLPSYP
 |---| |---|
 64 67 72

74 QADVFLICFLSPASFNVLAKWYEVQHHCNPTPIILVGTGLDLRDKDRIQKLKKEKX
 75
 98 101

134 LTPITVPOGLAMAKEMGA

...

 2 matches found in sequence:
 rapahuman; Ras-related protein Rap-1A (C21KG) (KREV-1 protein) (GTP-binding
 (from "bc_sp.pep")
 TOIG of: rapa_human check: 7493 from: 1 to: 184

ID RAPA HUMAN STANDARD; PRT; 184 AA.
 AC P10113;
 DT 01-MAR-1989 (Rel. 10, Created)
 DT 01-MAR-1989 (Rel. 10, Last sequence update)
 DT 15-MAR-2004 (Rel. 43, Last annotation update)
 DE Ras-related protein Rap-1A (C21KG) (KREV-1 protein) (GTP-binding
 DE protein SMG-P21A) (G-22K).
 GN RAP1A OR KREV1.
 OS Homo sapiens (Human),
 OS Mus musculus (Mouse),
 OS Rattus norvegicus (Rat), and
 OS Bos taurus (Bovine).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
 OX NCBI_TaxID=9606, 10090, 10116, 9913;
 RN [1]
 SEQUENCE FROM N.A.
 RC SPECIES=Human;
 RX MEDLINE=88319657; PubMed=3045729;
 RA Pizon V., Chardin P., Lerosey I., Olofsson B., Tavittian A.;
 RT "Human cDNAs rap1 and rap2 homologous to the Drosophila gene Dras3
 RT encode proteins closely related to ras in the 'effector' region.";
 RL Oncogene 3:201-204 (1988).
 RN [2]
 REVISION TO 3.
 RC SPECIES=Human;
 RA Pizon V.;
 RL Submitted (FEB-1989) to the EMBL/GenBank/DBJ databases.
 RN [3]
 SEQUENCE FROM N.A.
 RC SPECIES=Human; TISSUE=Brain;
 RA Puhl H.L. III, Ikeda S.R., Atonstam R.S.;
 RT "cDNA clones of human proteins involved in signal transduction
 RT sequenced by the Guthrie cDNA resource center (www.cdna.org).";
 RL Submitted (MAR-2002) to the EMBL/GenBank/DBJ databases.
 RN [4]
 SEQUENCE FROM N.A.
 RC SPECIES=Human;
 RA Coville G.;
 RL Submitted (SEP-1999) to the EMBL/GenBank/DBJ databases.
 RN [5]
 SEQUENCE FROM N.A.
 RC SPECIES=Human; TISSUE=Skin;
 RX MEDLINE=22388257; PubMed=12477932;
 RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
 RA Klausner R.D., Collins P.S., Wagner L., Shenmen C.M., Schuler G.D.,
 RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
 RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
 RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,

Stapleton M., Soares M.B., Ronaldo M.F., Casavant T.L., Scheetz T.E.,
 Brownstein M.J., Usdin T.B., Toshiyuki S., Carninci P., Prange C.,
 Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullahy S.J.,
 Rosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
 Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
 Villalón D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
 Fahey J., Helton E., Kettaman M., Madan A., Rodrigues S., Sanchez A.,
 Whitting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
 Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
 Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
 Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smilg D.E.,
 Schnerch A., Schein J.E., Jones S.U.M., Marra M.A.;
 RA "Generation and initial analysis of more than 15,000 full-length
 RT human and mouse cDNA sequences.";
 RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903 (2002).
 RN [6]
 PARTIAL SEQUENCE.
 RC SPECIES=Human; TISSUE=Platelet;
 RX MEDLINE=9000849; PubMed=2507536;
 RA Nagata K.-I., Itoh H., Katada T., Takenaka K., Ui M., Kaziro Y.,
 RA Nozawa Y.;
 RT "Purification, identification, and characterization of two
 RT GTP-binding proteins with molecular weights of 25,000 and 21,000 in
 RT human platelet cytosol. One is the rap1/smg21/Krev-1 protein and the
 RT other is a novel GTP-binding protein.";
 RL J. Biol. Chem. 264:17000-17005 (1989).
 RN [7]
 SEQUENCE OF 1-35.
 RC SPECIES=Human;
 RX MEDLINE=89034164; PubMed=3141412;
 RA Bokoch G.M., Parkos C.A., Mumby S.M.;
 RT "Purification and characterization of the 22,000-dalton GTP-binding
 RT protein substrate for ADP-ribosylation by botulinum toxin, G22K.";
 RL J. Biol. Chem. 263:16744-16749 (1988).
 RN [8]
 SEQUENCE OF 1-5; 17-24; 32-42 AND 152-168.
 RC SPECIES=Human;
 RX MEDLINE=89076301; PubMed=3144274;
 RA Ohmori T., Kikuchi A., Yamamoto K., Kawata M., Kondo J., Takai Y.;
 RT "Identification of a platelet Mr 22,000 GTP-binding protein as the
 RT novel smg-21 gene product having the same putative effector domain as
 RT the ras gene products.";
 RL Biochem. Biophys. Res. Commun. 157:670-676 (1988).
 RN [9]
 SEQUENCE FROM N.A.
 RC SPECIES=Mouse;
 RA Strausberg R.;
 RL Submitted (JUL-2001) to the EMBL/GenBank/DBJ databases.
 RN [10]
 SEQUENCE FROM N.A.
 RC SPECIES=Rat;
 RX MEDLINE=89089760; PubMed=2642744;
 RA Kitayama H., Sugimoto Y., Matsuzaki T., Ikawa Y., Noda M.;
 RT "A ras-related gene with transformation suppressor activity.";
 RL Cell 56:77-84 (1989).
 RN [11]
 SEQUENCE FROM N.A.
 RC SPECIES=Bovine;
 RX MEDLINE=89066693; PubMed=3143720;
 RA Kawata M., Matsui Y., Kondo J., Hishida T., Teranishi Y., Takai Y.;
 RT "A novel small molecular weight GTP-binding protein with the same
 RT putative effector domain as the ras proteins in bovine brain
 RT membranes. Purification, determination of primary structure, and
 RT characterization.";
 RL J. Biol. Chem. 263:18965-18971 (1988).
 RN [12]
 ISOPRENOID.
 RX MEDLINE=91114501; PubMed=1899909;
 RA Buss J.E., Quilliam L.A., Kato K., Casey P.J., Soltski P.A., Wong G.,
 RA Clark R., McCormick F., Bokoch G.M., Der C.J.;
 RT "The COOH-terminal domain of the Rap1A (Krev-1) protein is
 RT isoprenylated and supports transformation by an H-Ras:Rap1A chimeric
 RT protein.";

RL Mol. Cell. Biol. 11:1523-1530 (1991).
 RN [13]
 RP X-RAY CRYSTALLOGRAPHY (2.2 ANGSTROMS) OF 1-167.
 RX MEDLINE=95312074; PubMed=7791872;
 RA Nassar N., Horn G., Herrmann C., Scherer A., McCormick F.,
 RA Wittinghofer A.;
 RT "The 2.2 A crystal structure of the Ras-binding domain of the
 RT serine/threonine kinase c-Raf1 in complex with Rap1A and a GTP
 RT analogue.";
 RL Nature 375:554-560 (1995).
 RN [14]
 RP X-RAY CRYSTALLOGRAPHY (2.0 ANGSTROMS) OF 1-167.
 RX MEDLINE=96311310; PubMed=8756332;
 RA Nassar N., Horn G., Herrmann C., Block C., Janknecht R.,
 RA Wittinghofer A.;
 RT "Ras/Rap effector specificity determined by charge reversal.";
 RL Nat. Struct. Biol. 3:723-729 (1996).
 CC -!- FUNCTION: Induces morphological reversion of a cell line
 CC transformed by a Ras oncogene. Counteracts the mitogenic function
 CC of Ras, at least partly because it can interact with Ras GAFs and
 CC RAF in a competitive manner.
 CC -!- ENZYME REGULATION: Activated by guanine nucleotide-exchange
 CC factors (GEF) EFAC and EPAC2 in a CAMP-dependent manner, and GFR.
 CC -!- SUBCELLULAR LOCATION: Membrane-bound.
 CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Ras family.
 CC -!- DATABASE: NAME=Atlas Genet. Cytogenet. Oncol. Haematol.;
 CC WWW="http://www.infobiogen.fr/services/chromocancer/Genes/RAP1AID272.html".
 CC -----
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 DR EMBL; X12533; CAA31051.1; -;
 DR EMBL; M22995; AAA36150.1; -;
 DR EMBL; AF493912; AAM12626.1; -;
 DR EMBL; AL049557; CAB55685.1; -;
 DR EMBL; BC014086; AAH14086.1; -;
 DR EMBL; BC011105; AAH11105.1; -;
 DR EMBL; J04196; AAA30415.1; -;
 DR EMBL; A08691; CAA00804.1; -;
 DR PIR; A31961; A31961.
 DR PIR; A32342; A32342.
 DR PDB; 1GUA; 11-JAN-97.
 DR PDB; 1C1Y; 08-NOV-00.
 DR Genew; HGNC:9855; RAP1A.
 DR MIM; 179520; -; Rap1a.
 DR MGI; 97852; -; Rap1a.
 DR GO; GO:0003924; P:GTPase activity; TAS.
 DR GO; GO:0000074; P:regulation of cell cycle; TAS.
 DR GO; GO:0007165; P:signal transduction; TAS.
 DR InterPro; IPR003577; GTPase_Ras.
 DR InterPro; IPR001806; RasTnsfrmg.
 DR InterPro; IPR005225; Small_GTP.
 DR Pfam; PF00071; ras; 1.
 DR PRINTS; PR00449; RASTRNSFRMG.
 DR SMART; SM00173; RAS; 1.
 DR TIGRfam; TIGR00231; small GTP; 1.
 KW GTP-binding; Prenylation; Anti-oncogene; 3D-structure.
 FT CHAIN 1 181
 FT PROPEP 182 184 RAS-RELATED PROTEIN RAP-1A.
 FT NP_BIND 10 17 REMOVED IN MATURE FORM.
 FT NP_BIND 57 61 GTP (BY SIMILARITY).
 FT NP_BIND 116 119 GTP (BY SIMILARITY).
 FT DOMAIN 32 40 GTP (BY SIMILARITY).
 FT LIPID 181 181 EFFECTOR REGION (PROBABLE).
 FT STRAND 3 9 S-geranylgeranyl cysteine.
 FT TURN 12 13
 FT HELIX 16 25

FT STRAND 37 46
 FT TURN 47 48
 FT STRAND 49 57
 FT TURN 66 67
 FT HELIX 68 74
 FT STRAND 77 83
 FT TURN 84 85
 FT HELIX 87 91
 FT TURN 92 92
 FT HELIX 93 104
 FT TURN 105 105
 FT STRAND 111 116
 FT TURN 118 119
 FT HELIX 121 123
 FT HELIX 128 137
 FT TURN 138 140
 FT STRAND 142 145
 FT STRAND 147 147
 FT TURN 148 151
 FT STRAND 152 152
 FT HELIX 154 165
 SQ SEQUENCE 184 AA; 20987 MW; 42C39290C98E0A92 CRC64;
 RAPA HUMAN Length: 184 September 1, 2004 07:06 Type: P Check: 7493
 Pound using 'seq23' (hayes346.key)
 1 MREYKLVILGSGVGKSAITVQGIFFVEKYDPTIEDSYRQKVEVDCQCQCMLEILD
 4 7
 109 VPMILVGNKCDLEDERVVGSGQGNLQRCWNCAPLESKSKINWEIFYDLVRQINRK
 159
 169 TPVEKKPKKXKSCLLL

 2 matches found in sequence:
 sn33arath; SNAP25 homologous protein SNAP33 (AtSNAP33) (Synaptosomal-associat
 (from "ht_sp.pep")
 ToIG of: sn33_arath check: 8029 from: 1 to: 300
 ID SN33 ARATH STANDARD; PRT; 300 AA.
 AC Q9S7P9;
 DT 28-FEB-2003 (Rel. 41, Created)
 DT 28-FEB-2003 (Rel. 41, Last sequence update)
 DT 15-MAR-2004 (Rel. 43, Last annotation update)
 DE SNAP25 homologous protein SNAP33 (AtSNAP33) (Synaptosomal-associat
 DE protein SNAP25-like 1) (SNAP-25 like protein 1) (Snap25a).
 GN SNAP33 OR SNAP33B OR AT5G61210 OR MAF19 210 OR MAF19.2.
 OS Arabidopsis thaliana (Mouse-ear cress).
 OC Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
 OC Spermatophyta; Magnoliophyta; eudicotyledons; core eudicots; rosids;
 OC eucosids II; Brassicales; Brassicaceae; Arabidopsids.
 OX NCBI_TaxID=3702;
 RN [1]
 RP SEQUENCE FROM N.A., AND CHARACTERIZATION
 RC STRAIN=cv. Landsberg erecta, and cv. Columbia;
 RX MEDLINE=21490313; PubMed=11591731;
 RA Heese M., Gansel X., Sticher L., Wick P., Grebe M., Granier F.,
 RA Juergens G.;
 RT "Functional characterization of the KNOLLE-interacting t-SNARE
 RT AtSNAP33 and its role in plant cytokinesis.";
 RL J. Cell Biol. 155:239-249 (2001).
 RN [2]
 RP SEQUENCE FROM N.A.
 RC STRAIN=cv. Columbia;
 RX MEDLINE=98069011; PubMed=9405937;
 RA Kotani H., Nakamura Y., Sato S., Kaneko T., Asamizu E., Miyajima N.,
 RA Tabata S.;
 RT "Structural analysis of Arabidopsis thaliana chromosome 5. II.

RT Sequence features of the regions of 1,044,062 bp covered by thirteen
RT physically assigned pl clones.;
RL DNA Res. 4:291-300(1997).
RN [3]
RC SEQUENCE FROM N.A.
RX STRAIN=cv. Columbia;
RA MEDLINE=22954850; PubMed=14593172;
RA Yamada K., Lim J., Dale J.M., Chen H., Shinn P., Palm C.J., Cheuk R.F.,
RA Southwick A.M., Wu H.C., Kim C.J., Nguyen M., Pham P.K., Lam B., Sakano H., Wu T., Yu G.,
RA Karlin-Newmann G., Liu S.X., Lam B., Sakano H., Wu T., Yu G.,
RA Miranda M., Quach H.L., Tripp M., Chang C.H., Lee J.M., Toriumi M.J.,
RA Chan M.M., Tang C.C., Onodera C.S., Deng J.M., Akiyama K., Ansari Y.,
RA Arakawa T., Banh J., Banno F., Bowser L., Brooks S.Y., Carninci P.,
RA Chao Q., Choy N., Enju A., Goldsmith A.D., Gurjal M., Hansen N.F.,
RA Hayashizaki Y., Johnson-Hopson C., Hsuan V.W., Iida K., Karnes M.,
RA Khan S., Koesema E., Ishida J., Jiang P.X., Jones T., Kawai J.,
RA Kamiya A., Meyers C., Nakajima M., Narusaka M., Seki M., Sakurai T.,
RA Satou M., Tamse R., Vaysberg M., Wallender E.K., Wong C., Yamamura Y.,
RA Yuan S., Shinozaki K., Davis R.W., Theologis A., Ecker J.R.;
RT "Empirical analysis of transcriptional activity in the Arabidopsis
RT genome".
RL Science 302:842-846(2003).
RN [4]
RC SEQUENCE FROM N.A.
RA Brover V., Trukhan M., Alexandrov N., Lu Y.-P., Flavell R.,
RA Feldmann K.A.;
RT "Full-length cDNA from Arabidopsis thaliana";
RL Submitted (MAR-2002) to the EMBL/GenBank/DBJ databases.
RN [5]
RC CHARACTERIZATION, AND INTERACTION WITH KNOLLE AND SYP121.
RX MEDLINE=21576055; PubMed=11718726;
RA Kargul J., Gansel X., Tyrrell M., Sticher L., Blatt M.R.;
RT "Protein-binding partners of the tobacco syntaxin Nt-Syrl.";
RL FEBS Lett. 508:253-258(2001).
RN [6]
RC INDUCTION.
RX MEDLINE=22631601; PubMed=12746539;
RA Wick P., Gansel X., Oulevey C., Page V., Studer I., Durst M.,
RA Sticher L.;
RT "The expression of the t-SNARE AtSNAP33 is induced by pathogens and
RT mechanical stimulation.";
RL Plant Physiol. 132:343-351(2003).
CC -!- FUNCTION: T-SNARE involved in diverse vesicle trafficking and
CC membrane fusion processes, including cell plate formation. May
CC function in the secretory pathway.
CC -!- SUBUNIT: Interacts with the cytokinesis-specific syntaxin KNOLLE
CC and with SYP121.
CC -!- SUBCELLULAR LOCATION: Membrane-associated. Plasma membrane, some
CC endomembrane compartment and cell plate in dividing cells.
CC -!- TISSUE SPECIFICITY: Ubiquitous, with a strong expression in root
CC tips, ovules, very young leaves, vascular tissue, hydathodes,
CC stipules and the abscission and dehiscence zones of the silicles.
CC -!- INDUCTION: Locally and systemically induced by pathogen infection
CC and locally only by mechanical stresses.
CC -!- MISCELLANEOUS: Specifically cleaved by the botulinum neurotoxins
CC BotN/A and BotN/E.
CC -!- SIMILARITY: Belongs to the SNAP-25 family.
CC -!- SIMILARITY: Contains 1 t-SNARE coiled-coil homology domain.
CC
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CC
CC -----
CC EMBL; X92420; CAB52583.1; --
CC EMBL; X92419; CAB52582.1; --
CC EMBL; Y13198; CAC79615.1; --
CC EMBL; AB006696; BAB10383.1; --
CC EMBL; AY057627; AAL15258.1; --
CC EMBL; AY141994; AAM98256.1; --
CC

DR EMBL; AY085322; AAM62553.1; --
DR InterPro; IPR000928; SNAP-25.
DR InterPro; IPR000727; T-SNARE.
DR Pfam; PF00835; SNAP-25; 1.
DR Pfam; PF05739; SNARE; 1.
DR PROSITE; PS0192; T-SNARE; 1.
KW Cell cycle; Cell division; Transport; Protein transport; Membrane;
KW Coiled coil; Multigene family.
FT DOMAIN 235 297 T-SNARE COILED-COIL HOMOLOGY.
SQ SEQUENCE 300 AA; 33644 MW; 685A0484608C6DE7 CRC64;
SN33 ARATH Length: 300 September 1, 2004 07:06 Type: P Check: 8029 ..
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54 MTNPFQGERVQKQSSSSKQSLFSNSKYQYKNNFRSGGIENOSVQELGYAVYKABETT
104
114 KSVQGLKVAEDIRSDATRLVMLHDQGEQITRTHKAVEIDHD
...
181 TRPFGPVVTRDDSPTRRVNHLKREKLGNSAPRGQSTRFPLPESADAYQVWEKAK
231
241 QDDGLSDLSILGELKNMVDGMSEIEKQNKGLDHLHDDVDDELN
...

28 matches found in sequence:
tetxclote; Tetanus toxin precursor (EC 3.4.24.68) (Tentoxylisin) [Contains:
TOIG of: tetx_clote check: 5503 from: 1 to: 1314
ID TETX CLOTE STANDARD; PRT; 1314 AA.
AC P04958;
DT 13-AUG-1987 (Rel. 05, Created)
DT 13-AUG-1987 (Rel. 05, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Tetanus toxin precursor (EC 3.4.24.68) (Tentoxylisin) [Contains:
DE Tetanus toxin light chain (Tetanus toxin chain L); Tetanus toxin heavy
DE chain (Tetanus toxin chain H)].
GN TETX OR CTP60.
OS Clostridium tetani.
OG Plasmid pE88, and plasmid 75 Kbp.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1513;
OX [1]
RN SEQUENCE FROM N.A.
RC PLASMID=75 Kbp;
RX MEDLINE=8705384; PubMed=3536478;
RA Eisel U., Jarausch W., Goretzki K., Henschen A., Engels J.,
RA Weller U., Hudel M., Habermann E., Niemann H.;
RA "Tetanus toxin: primary structure, expression in E. coli, and
RT homology with botulinum toxins.";
RL EMBO J. 5:2495-2502(1986).
RN [2]
RN SEQUENCE FROM N.A.
RC STRAIN=CN3911; PLASMID=75 Kbp;
RX MEDLINE=87040747; PubMed=3774547;
RA Fairweather N.F., Lyness V.A.;
RA "The complete nucleotide sequence of tetanus toxin.";
RL Nucleic Acids Res. 14:7809-7812(1986).
RN [3]
RN SEQUENCE FROM N.A.
RC STRAIN=Massachusetts / E88; PLASMID=pE88;
RX MEDLINE=22457253; PubMed=12552129;
RA Brueggemann H., Baeumer S., Fricke W.F., Wierze A., Liesegang H.,

RA Decker I., Herzberg C., Martinez-Arias R., Merkl R., Henne A.,
 RA Gottschalk G.;
 RT "The genome sequence of Clostridium tetani, the causative agent of
 RL tetanus disease.";
 RL Proc. Natl. Acad. Sci. U.S.A. 100:1316-1321(2003).
 RN [4]
 RP SEQUENCE OF 742-1314 FROM N.A.
 RC PLASMID=75 Kbp;
 RX MEDLINE=86085672; PubMed=3510187;
 RA Fairweather N.F., Lyness V.A., Pickard D.J., Allen G., Thomson R.O.;
 RT "Cloning, nucleotide sequencing, and expression of tetanus toxin
 RL fragment C in Escherichia coli.";
 RL J. Bacteriol. 165:21-27(1986).
 RN [5]
 RP PARTIAL SEQUENCE, AND DISULFIDE BONDS.
 RX MEDLINE=90201034; PubMed=2108021;
 RA Krieglstein K., Henschen A., Weller U., Habermann E.;
 RT "Arrangement of disulfide bridges and positions of sulfhydryl groups
 RL in tetanus toxin.";
 RL Eur. J. Biochem. 188:39-45(1990).
 RN [6]
 RP PARTIAL SEQUENCE.
 RX MEDLINE=92037649; PubMed=1935979;
 RA Krieglstein K.G., Henschen A.H., Weller U., Habermann E.;
 RT "Limited proteolysis of tetanus toxin. Relation to activity and
 RL identification of cleavage sites.";
 RL Eur. J. Biochem. 202:41-51(1991).
 RN [7]
 RP IDENTIFICATION AS ZINC-PROTEASE.
 RX MEDLINE=93010948; PubMed=1396558;
 RA Schiavo G., Poulain B., Rossetto O., Benfenati F., Tauc L.,
 RA Montecucco C.;
 RT "Tetanus toxin is a zinc protein and its inhibition of
 RL neurotransmitter release and protease activity depend on zinc.";
 RL EMBO J. 11:3577-3583(1992).
 RN [8]
 RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=93063293; PubMed=1331807;
 RA Schiavo G., Benfenati F., Poulain B., Rossetto O., de Laureto P.P.,
 RA Dasgupta B.R., Montecucco C.;
 RT "Tetanus and botulinum-B neurotoxins block neurotransmitter release
 RL by proteolytic cleavage of synaptobrevin.";
 RL Nature 359:832-835(1992).
 RN [9]
 RP X-RAY CRYSTALLOGRAPHY (2.7 ANGSTROMS) OF 874-1314.
 RX MEDLINE=97475217; PubMed=9334741;
 RA Umland T.C., Wingert L.M., Swaminathan S., Furey W.F., Schmidt J.J.,
 RA Sax M.;
 RT "Structure of the receptor binding fragment HC of tetanus
 RL neurotoxin.";
 RL Nat. Struct. Biol. 4:788-792(1997).
 CC -!- FUNCTION: TETANUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
 CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
 CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
 CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
 CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
 CC ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 76-GLN-|-PHE-77
 CC BOND OF SYNAPTOSOMAL-2.
 CC -!- CATALYTIC ACTIVITY: Hydrolysis of 76-Gln-|-Phe-77 bond in
 CC synaptobrevin 2.
 CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
 CC -!- SUBUNIT: THE PRECURSOR POLYPEPTIDE IS SUBSEQUENTLY CLEAVED TO
 CC YIELD SUBCHAINS L AND H. THESE REMAIN LINKED BY A DISULFIDE BRIDGE
 CC AND ARE NON-TOXIC AFTER SEPARATION.
 CC -!- MISCELLANEOUS: THE C-TERMINAL OF THE HEAVY CHAIN BINDS TO
 CC GANGLIOSIDE RECEPTORS.
 CC -!- SIMILARITY: Belongs to peptidase family M27.
 CC
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 CC EMBL; X04436; CAA28033.1; -;
 CC EMBL; X06214; CAA29564.1; -;
 CC EMBL; AF528097; AAO37454.1; -;
 CC EMBL; M12739; AAA23282.1; -;
 CC PIR; A25689; BTCLTN.
 CC PDB; 1AF9; 29-APR-98.
 CC PDB; 1A8D; 14-OCT-98.
 CC PDB; 1DOH; 27-MAR-00.
 CC PDB; 1DFQ; 24-MAR-00.
 CC PDB; 1DIW; 24-MAR-00.
 CC PDB; 1DLL; 24-MAR-00.
 CC PDB; 1FV3; 05-SEP-01.
 CC MEROPS; M27.001; -;
 CC InterPro; IPR008985; ConA_like_lect_gl.
 CC InterPro; IPR002160; Kunitz_legume.
 CC InterPro; IPR006025; Pept_M_Zn_BS.
 CC InterPro; IPR000395; Peptidase_M27.
 CC Pfam; PF01742; Peptidase_M27; 1.
 CC PRINTS; PR00760; BONTOXILYSIN.
 CC ProDom; PD001963; Bontoxilysin; 1.
 CC PROSITE; PS00142; ZINC_PROTEASE; 1.
 CC Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc; Plasmid;
 CC 3D-structure; Complete; proteome.
 CC INIT MET 0
 CC CHAIN 1 456
 CC METAL 457 1314
 CC ACT_SITE 232 232
 CC METAL 233 233
 CC METAL 236 236
 CC TRANSMEM 226 246
 CC TRANSMEM 669 689
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 CC HELIX 876 882
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SQ SEQUENCE

TEXT CLOTE Length: 1314 September 1, 2004 07:06 Type: P Check: 5503 ..
Found using 'seq23' (hayes346.key)

1 PITINNFRYSDPVNNDTIIMMEPPYCKGLDIYYKAPKITDRIWIVPERYBFGTKPEDFNP
  32 35
  33 36

61 PSSLIIGASEYDYPNLYRTDSKDRFLQTMVKLFNRKNNVAGEALLDKIINAIPYLGNS

121 YSLIDKFDTHNSVSFNLLBQDPGATTKSAMLTNLIIFGPGPVINKNEVRGIV
  121

...

248 SHELIIPSKQBIYMOHTYPIABELFTFGQDANLISIDIKNDLYEKTINDYKAIAKANKLSQ
  298

308 VTSCNDENIDIDSYKQIYQKYQFQDKDSNGYIVNEDKFQILYNSIMYGFTEIELGKKFN
  321
  350

368 IKTRLSYFSMNHDPVKIPNLLDDTIYNDTEGFNIESKDLSEYKGQNMVRVNTNAFRNVGD
  374
```

```
...
510 KIIVDYNLOSKITPLPNDRTPTVTGIPYAPYKSAASTIEIHNDNDNTTIYQYLYAQKSP
  560
  562

570 TTLQRTMTNSVDDALINSTKIYSYFPSPVSKVNOGAQGLFLQWRDIIDDFTNESSQK
  592

630 TTIDKISDVSTIVPYI

...

661 IGALETTGVVLLLEYIPEITLPVIAALSAESSTQKEKIITIDNFEKRYEKWIEYKIL
  711
  718

721 VKAKWLGTVNTQFQKRSYQMSLEYQVDAIKKIIDYEYKIYSGDPKEQIADEINNLKKN
  721
  738
  741
  759

781 LEEKANKAMININIFMRESSRSFLVNQMINAEAKKOLLEFDTQSKNIMQMOKANSKEFIGI
  830

841 TELKLESKINKVFSTPIPFYSYKNLDCWVDNEEDIDVILKKSTILMDINNDIISDISG
  908
  942

901 FNSSVITYPDQQLVPGINGKAIHLVNNESSSEVIVHKAMDIEYNDMFNNFTVSVFLRVPKV
  973

961 SASHLEQYGTNEYSIISMMKKHSLSISGSGWSVLKGNLITWLKDSAGEVRQITFRDLPD
  973

1021 KFNAYL

...

1032 FIITNDRLLSSANLYINGVLMGSAEITGLCAIRDNDNITLKLDRCNNNOYVSDIKDRIF
  1082

1092 CKALNPKEIEKLYTSYLSITFLRDFWGNPLRYDTEYVLIIPVASSSKDVQLKKNITDYMILT
  1104
  1107
  1127

1152 NAPSYYTNGKLNIXYRRLYNGLKFIIKRYTPNNEIDSPVKSQDFIKLVSVYNNNEHIVGYP
  1165
  1169

1212 KQGNFANLDRILRVGYNAPGIPLYKKQWEAVKLRDLKTSYVQLKLYDDKNASLGLVGTNH
  1236

1272 GQIGNDPNRDILIASWY

...

Times: -- Search Statistics -- CPU Total Elapsed
```

00:00:00.01

00:00:01.00

Number of sequences searched:

30

Number of sequence hits:

28

Number of separate matches:

408

Number of sequence hits saved:

0

> O
O| |O IntelliGenetics
> O <

Quest - Quick User-directed Expression Search Tool
Release 5.4

-- Outline of search "seq23spt" --

Selected search type is key against sequence data banks or files.
Selected scope is Sequence.

Selected sequence key from "hayes346.key":
seq23 (AA) ID seq23 AA preliminary pattern
followed by

- 1 y
- 2 any character
- 2 any character
- 2 1 or i or m or a or f or w or v or y

Selected files:

File : bt_spt.pep

-- Output Parameters --

Format Options:

| | | |
|-----------------------------|-------|----------------------|
| Nucleic acid code matching | Exact | File Options: |
| Find non-matching hits only | No | Indirect file |
| Report key used | Yes | Sequence or key file |
| Note position of hit | Yes | List of hits |
| Display full annotations | Yes | Hit display |
| Sequence context | Yes | Name and annotations |

-- Run Parameters --

| | |
|--------------------------|-------|
| Run mode | Batch |
| Time to start comparison | now |
| Notify at end of run | No |

1 match found in sequence:

o01388 ; Synaptobrevin homolog.
(from "bt_spt.pep")

TOIG of: o01388 check: 1900 from: 1 to: 169

| | | | | |
|----|--|--------------|------|---------|
| ID | O01388 | PRELIMINARY; | PRT; | 169 AA. |
| AC | O01388; | | | |
| DT | 01-JUL-1997 (TREMELrel. 04, Created) | | | |
| DT | 01-JUL-1997 (TREMELrel. 04, Last sequence update) | | | |
| DT | 01-JUN-2003 (TREMELrel. 24, Last annotation update) | | | |
| DE | Synaptobrevin homolog. | | | |
| OS | Hirudo medicinalis (Medicinal leech). | | | |
| OC | Eukaryota; Metazoa; Annelida; Clitellata; Hirudinida; Hirudinea; | | | |
| OC | Arychobdellida; Hirudiniformes; Hirudinidae; Hirudo. | | | |
| OX | NCBI_TaxID=6421; | | | |
| RN | [1] | | | |
| RP | SEQUENCE FROM N.A. | | | |
| RC | TISSUE=Nerve cord; | | | |
| RX | MEDLINE=97197869; PubMed=9045719; | | | |
| RA | Bruns D., Engers S., Yang C., Ossig R., Jeromin A., Jahn R.; | | | |
| RA | "Inhibition of transmitter release correlates with the proteolytic | | | |
| RT | activity of tetanus toxin and botulinus toxin A in individual cultured | | | |
| RT | synapses of Hirudo medicinalis." | | | |
| RL | J. Neurosci. 17:1898-1910(1997). | | | |
| DR | EMBL; U85805; AAC47498.1; | | | |
| DR | InterPro; IPR001388; Synaptobrevin. | | | |
| DR | Pfam; PF00957; synaptobrevin; 1. | | | |
| DR | PRINTS; PR00219; SYNAPTOBREVN. | | | |
| DR | ProDom; PD001229; Synaptobrevin; 1. | | | |
| DR | PROSITE; PS00892; V_SNAPE; 1. | | | |
| SQ | SEQUENCE 169 AA; 17817 MW; 363A0B3158F7B12B CRC64; | | | |

O01388 Length: 169 September 1, 2004 07:07 Type: P Check: 1900
Found using 'seq23' (hayes346.key)

...

| | | |
|----|--|-----|
| 64 | GRADALQAGASQFEASAGKLRKRFWKNMKMLIMGAVVAVVVVIFGAWIYNKFSGTSSV | 114 |
|----|--|-----|

| | | |
|-----|---|--|
| 124 | POEGTFLQSPMAQQPQSLPNIIPASPVGGGGGKGNKQPH | |
|-----|---|--|

...

2 matches found in sequence:

o01390 ; Syntaxin 1 homolog.
(from "bt_spt.pep")

TOIG of: O01390 check: 5090 from: 1 to: 295

| | | | | |
|----|--|--------------|------|---------|
| ID | O01390 | PRELIMINARY; | PRT; | 295 AA. |
| AC | O01390; | | | |
| DT | 01-JUL-1997 (TREMELrel. 04, Created) | | | |
| DT | 01-JUL-1997 (TREMELrel. 04, Last sequence update) | | | |
| DT | 01-OCT-2003 (TREMELrel. 25, Last annotation update) | | | |
| DE | Syntaxin 1 homolog. | | | |
| OS | Hirudo medicinalis (Medicinal leech). | | | |
| OC | Eukaryota; Metazoa; Annelida; Clitellata; Hirudinida; Hirudinea; | | | |
| OC | Arychobdellida; Hirudiniformes; Hirudinidae; Hirudo. | | | |
| OX | NCBI_TaxID=6421; | | | |
| RN | [1] | | | |
| RP | SEQUENCE FROM N.A. | | | |
| RC | TISSUE=Nerve cord; | | | |
| RX | MEDLINE=97197869; PubMed=9045719; | | | |
| RA | Bruns D., Engers S., Yang C., Ossig R., Jeromin A., Jahn R.; | | | |
| RA | "Inhibition of transmitter release correlates with the proteolytic | | | |
| RT | activity of tetanus toxin and botulinus toxin A in individual cultured | | | |
| RT | synapses of Hirudo medicinalis." | | | |
| RL | J. Neurosci. 17:1898-1910(1997). | | | |
| DR | EMBL; U85807; AAC47500.1; | | | |
| DR | HSSP; P32851; 1BR0. | | | |
| DR | GO; GO:0016020; C:membrane; IEA. | | | |
| DR | GO; GO:0008585; F:protein transporter activity; IEA. | | | |
| DR | GO; GO:0006886; P:intracellular protein transport; IEA. | | | |
| DR | InterPro; IPR006012; Syntaxin. | | | |
| DR | InterPro; IPR006011; Syntaxin_N. | | | |
| DR | InterPro; IPR000727; T_SNAPE. | | | |
| DR | Pfam; PF05739; SNAPE; 1. | | | |
| DR | Pfam; PF00804; Syntaxin; 1. | | | |
| DR | SMART; SM00503; Syn; 1. | | | |
| DR | SMART; SM00397; t_SNAPE; 1. | | | |
| DR | PROSITE; PS00914; SYNTAXIN; 1. | | | |
| DR | PROSITE; PS0192; T_SNAPE; 1. | | | |
| SQ | SEQUENCE 295 AA; 33581 MW; 0DB3CC637A5886AF CRC64; | | | |

O01390 Length: 295 September 1, 2004 07:07 Type: P Check: 5090
Found using 'seq23' (hayes346.key)

...

| | | |
|----|--|-----|
| 90 | KTANKVRGLKVLQKIEQEEETNKSSADLRIRKTOHSTILRKFTIEVNNQYNAQVDYRD | 140 |
|----|--|-----|

| | | |
|-----|--|--|
| 150 | GCKKRLQRMETITGRTATTNEELEDLMSGNPAIFTQGIITDQ | |
|-----|--|--|

...

| | | |
|-----|--|-----|
| 213 | QSIKELHDMFMDMAMLVESQCEMIDRIEHNVEKAVDYVETAADTKKAMKYQSAARKKI | 263 |
|-----|--|-----|

| | | |
|-----|------------------------|--|
| 273 | ILICVSVLILIVGSGLLGIFIP | |
|-----|------------------------|--|

```
-----
15 matches found in sequence:
o06015 ; HA-70 protein (Fragment).
(from "bt_spt.pep")
TOIG of: o06015 check: 1783 from: 1 to: 488

ID O06015 PRELIMINARY; PRT; 488 AA.
AC O06015;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA-70 protein (Fragment).
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61225.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
DR NON_TER 488
FT SEQUENCE 488 AA; 55791 MW; 4789988BA9FA1640 CRC64;
SQ

O06015 Length: 488 September 1, 2004 07:07 Type: P Check: 1783
Found using 'seq23' (hayes346.key)

...

67 NTPCYPTSSFNEKYIRDIVQNVFGNFNEVNPQIPGFECSTAPDNKLYMYLQVTVIR
127 117 122
127 119 124

127 YEIKVLQQQITERAVLYVPSLGYVKSIEFNSNEKIDKNFYQVDDKILNEQFLYKKIS
127 167 182

187 STNTNKNKNDINTNSNTKTQPLVPYNSGLYVINKGQGYIRTDNRD

...

263 FISSNLTKFSQYTERLKDAFNKLFNTSTALFKFVEEAPANKNICIKAYNTYKVELV
313 319
316

323 EYRNGTIINSAQYXPLPSLYGSEVIDVPSSGAPVVTPIVETQFKGPEEIVIGVISP
342

383 ENIQQINTAISESYTDIPDIVGKKPFYILFTVNTNPNFYKISAEDNSVPLKIVEIGSGN
410 435
435
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```
443 RNMQDGLNSNDNIKAINYITGFDFSDKOYLIVQLFKGKNYYIRIPQ
471 483

-----
3 matches found in sequence:
o06016 ; HA-II protein.
(from "bt_spt.pep")
TOIG of: o06016 check: 8501 from: 1 to: 147

ID O06016 PRELIMINARY; PRT; 147 AA.
AC O06016;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-II protein.
GN HA-II.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61226.1; -.
DR InterPro; IPR008903; Botulinum HA-17.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; RicinB lectin.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SMART; SM00458; RICIN; 1.
DR SEQUENCE 147 AA; 17373 MW; 840EF98F4348FB67 CRC64;
SQ

O06016 Length: 147 September 1, 2004 07:07 Type: P Check: 8501
Found using 'seq23' (hayes346.key)

...

17 SIFSDSLYTLPLSELITFLTSTSENNOVKLQVVEEKNAKYNIAQPDKYLYTNSQFI
67 70

77 VLKNGDSTALENYWIPYKTASNTYITNLKEYDKAWDIYDLNGDISDQPLLLQQLFYFE
94 97 109

137 KSNQMFI FEKI

-----
3 matches found in sequence:
o06017 ; P-21 protein.
(from "bt_spt.pep")
TOIG of: o06017 check: 2847 from: 1 to: 181

ID O06017 PRELIMINARY; PRT; 181 AA.
AC O06017;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein.
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
SQ
```



```

RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (Clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
RL EMBL: X87972; CAA61227.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 181 AA; 21888 MW; AD156F632C55BAE4 CRC64;

O06017 Length: 181 September 1, 2004 07:07 Type: P Check: 2847 ..
Found using 'seq23' (hayes346.key)

1 MKMKDIFLHVKTLKNNTEFEIYRNFENFIDMLTRKYDVEKDYNDIVSHLWILKKTID
25 28 |---| |---|
45 48

61 LNKFNTEYDLEKYISTLSKRYCIDICKKNNRVYINSEFVDINLSLIEHSFSNDLEFE

121 FNDLISILPNSORKIIMRFNNFNMMKEVDIAEELNSROAVYKSKNALKKGESVIKELIN
137 |---|

181 I

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27 marches found in sequence:
o06018 ; NTNH protein.
(from "bt_spt.pep")
TOIG of: o06018 check: 3170 from: 1 to: 1198

ID O06018 PRELIMINARY; PRT; 1198 AA.
AC O06018;
DT 01-JUL-1997 (TREMBLrel. 04, Created)
DT 01-JUL-1997 (TREMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TREMBLrel. 25, Last annotation update)
DB NTNH protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
RL EMBL: X87972; CAA61228.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR003016; Lipoyl BS.
DR Pfam; PF01742; Peptidase M27.
DR PRINTS; PR00760; BONTOLILYSIN.
DR ProDom; PD001963; Bontoxilysin.
DR PROSITE; PS00189; LIPOYL.
SQ SEQUENCE 1198 AA; 139082 MW; A7C4A31A5E5BEF60 CRC64;

O06018 Length: 1198 September 1, 2004 07:07 Type: P Check: 3170 ..
Found using 'seq23' (hayes346.key)

...

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```

60 NGGVYDSNLSQNEKDFLOAIITLLKRINSIAGEKLLSLVSTAIPPPYGIYGGYYC
110
120 PNIIVFGSTIKYKKINSLSITTIPIPPYGGYRETNVLSKSDTENFYANNIVIFGPGANIV
147 |---| |---| |---|
180 ENNTVYKKEAENGMTMAEICFQFFLTYYKDYDQFYVDPALMECLIKSLYFLYGIKEN
211 |---| |---| |---|
240 NMLTVYRLRNELSNIBFSQSLIVDLLISGGIDSKFINVDPWFIDSYDSFSNAKTTFEEHK
281 |---|
300 SIYETEIKGNAIGNDIKRLKQKQFTTVDHIWQLNLDYFSKEFQIMMPYRFNNALKYYY
360 RKEYYKIDYPEKYISAGFVGGQNLQTLSLSDKNQYIINKPELIVNLISENNISLRSNIY
363 |---| |---| |---|
420 GDGLKYTTDNFYSTYKIPYNRAYEVHFNNSSTSLENVNVVEISNIPEIDINPYRENSD
431 |---| |---| |---|
480 IFSPVENIETKEVNTKTPWPINYLQAOQIPNNEEFTLSDFSQVVSFKTQSLVYSGFLSNV
503 |---| |---| |---|
540 ISYLDVSDVTNPIDTDEKYLWLREIFRNYSDITAIEINTSGINKVSWFGKALNIL
558 |---| |---|
559
600 NTNSFVKEFKNL
...
615 ISLINKENLSPPIEVNEIPNDMLGLSLKDLNEKLFNLYLKNILYFKKVVESFLDQWWT
665 |---| |---| |---|
675 EYSGYGLICWAKQSILAQENLIKVIQKKLSLDSKQSNISNEKINLMNLTTTEKTFIDL
677 |---| |---| |---|
680
735 SNQSQIAMNNINFLNKAACVFSFNTPKFIISPMQEQYINNINIKTTAFIRKCTNITEKE
762 |---| |---| |---|
795 KLQLINQNTFNNLDFEPDIQTIENTNLITSETNLIIKEKTSYDILLFSLQADRRKVIKDI
836 |---| |---| |---|
855 SGKDTLVOYSDTIDLSYGVNGDALYLKEPNQSVNF
...
912 QQDNLSNLIIGNVNCQWQIYFENNGLVFMSVDCNGNEKNYLSVDLSKYWYISVSD
962 |---| |---| |---|
965
972 PLRNKLIFINDKLIVNESIEQILNIYSSNIISLVNENNPICELSILNKALTSSEVIN
1032 SYFTNLNNSYIRDSYGARLEYKNKYNYVFPENSLEYEVENNNMYLSIKNIKNITLIG
1056 |---| |---| |---| |---|
1078

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```

1092  AXFKLINTDESKQYVQWDEVIICVLGDTFEKADIQAGNNRIQLVNSKONARKIIVNNNI
      |---|
      1123
1152  FRPNCVLFYNKKYLSLRNNYNNWMCNDNSFIPKHAHLWLKKI
      |---|
      1165
-----
2 matches found in sequence:
006019 : Bont protein (Fragment).
(from "bt_spt.pep")
TOIG of: 006019 check: 7504 from: 1 to: 50

ID 006019 PRELIMINARY; PRT; 50 AA.
AC 006019;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE BONT protein (Fragment).
GN BONT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
botulinum neurotoxin complex in Clostridium botulinum (clostridium
argentinense) type g and non-proteolytic clostridium botulinum type
b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61229.1; --
DR HSSP; P10845; 3BTA.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase.M27.
DR Pfam; PF01742; Peptidase.M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
FT NON TER 50
SQ SEQUENCE 50 AA; 6036 MW; 04B0316B5A95C199 CRC64;

006019 Length: 50 September 1, 2004 07:07 Type: P Check: 7504
Found using 'seq23' (hayes346.key)

1 MPVNIKFNVDNDDIIMPEFNDPGTYYKAPRIIDRIWIPIRY
      |---|
      33 36
      34 37
-----
7 matches found in sequence:
033870 : Orf-22.
(from "bt_spt.pep")
TOIG of: 033870 check: 2449 from: 1 to: 178

ID 033870 PRELIMINARY; PRT; 178 AA.
AC 033870;
DT 01-JAN-1998 (TrEMBLrel. 05, Created)
DT 01-JAN-1998 (TrEMBLrel. 05, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Orf-22.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

1059
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Lamanna;
RA Yang G.H.;
RT "Nontoxic components of Clostridium botulinum type B progenitor
submitted (JUL-1996) to the EMBL/GenBank/DBJ databases.
EMBL; U63808; AAB64349.1; --
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 178 AA; 21626 MW; 42382A79E7CE6B50 CRC64;

033870 Length: 178 September 1, 2004 07:07 Type: P Check: 2449
Found using 'seq23' (hayes346.key)

1 MNKLFQLQIEMLKSDNEEFQEIFKHFKEITINIFTRKYNIDYNDILYHLWYTLKKVDLSN
      |---|
      36 39 42 45 50
      39 42
61 FNTQNDLERYISRTLKRYCUDICNKRKIDKKIYNGEIAADKKLSLIANSYSYSEFEFND
      |---|
      110 113
121 LISILPDDQKKIYKFEVDIKEIDIAKKLINISQSVYKMKIMALERLEPILKKLINM
      |---|
      134
-----
25 matches found in sequence:
033871 : Nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: 033871 check: 4829 from: 1 to: 1197

ID 033871 PRELIMINARY; PRT; 1197 AA.
AC 033871;
DT 01-JAN-1998 (TrEMBLrel. 05, Created)
DT 01-JAN-1998 (TrEMBLrel. 05, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Nontoxic-nonhemagglutinin component.
GN NTNH/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Lamanna;
RA Yang G.H.;
RT "Nontoxic components of Clostridium botulinum type B progenitor
submitted (JUL-1996) to the EMBL/GenBank/DBJ databases.
EMBL; U63808; AAB64350.1; --
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR000395; Peptidase.M27.
DR Pfam; PF01742; Peptidase.M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1197 AA; 138809 MW; 2AB7DE9B488F918E CRC64;

033871 Length: 1197 September 1, 2004 07:07 Type: P Check: 4829
Found using 'seq23' (hayes346.key)

```

```
60  DGGIYDSNPLSQDSEKDFLQAIITLLKRINSTNAGEKLLSLISTALPFFYGYIGGGYYA
    |---|
    110
120  PNMITFGSAPKSNKLLNSLSTIPFPYAGYRETNLYLSSDKNKSFYASNIVIRPGGANIV
    |---|
    147
180  ENNTVYFKKEDAEANGMTETIWFQPFLLTYKDEFYIDPAIELIKLIKLSLYFLYGKPS
    |---|
    211
240  DDLVITPRLRSELENTYEQSLNIVDLLVSGGIDPKFINTDPYWFNTDNYFSNAKVFEDHR
    |---|
    257
300  NIYETQIEGNN
...
313  GNDIKLRKQFRININDIWELNLNLYFSKEFSIMPPDRFNALKHFKYKQYKIDYPENY
    |---|
    363
373  SINGFVNGQINVQLSLSDRNQDILNKPEEIIINLLGNNVSLMRSNYIGDLKSTVDVFS
    |---|
    431
433  NYKIPYNRAYEYHFNNSSDLSLNVNIGVIDNPEIIDVNPYKENCDFSPVQKITREB
    |---|
    434 438
493  INTNIPWPINYLQAOQNTNNEKFSLSDDFVEVVSSKDSLVYFSLNVMFYLSIKYNSPI
    |---|
    503
553  DTDKKYLLWLREIFRNYSPDITATQETDCGINKVVTWFGKALNLTNSDSFVEEFQNL
    |---|
    558
    559
...
615  ISLINKENLSPITIEIYIPNDMLGLPLNDLNEKLNILYKNILYFKKYVFNFLDQWWT
    |---|
    665
675  EYYSQYFDLICMAKQSIQAQEKLIQIIONKLODLFKADISMDKLNLMNLATEKTFIDLS
    |---|
    677
    680
735  NESQTAINNINDFLNKSAICVFDNTNYPKFISEFMEQCINSVNSVTAFIQKTNITEDEK
    |---|
    761
795  LQLIKNTFMNIDFEFDIQSIKDLITSETDLIKEKESDYNLFLTLQEDNNKVIEDIS
    |---|
    835
855  GKNTLVKYSDSISLVYGVNGDAIYLKEPDESVSF
...
914  IITSKLIENKADNCWEIYFENNGLVFSIVDCNGNEENIYLSDVISKWNYIISIDRLR
    |---|
    964
974  NOLLIFINDKLIANQSIQILNLYSSNTISLVNENNPIYIEGLSILNRSITSEEVNNYF
    |---|
    1032
```

```
1034  SYLNNSYIRDISGERLEYNKTYELXNVVPFSPENSIVETENNLYLSIKDTNNLNIEGAKF
    |---|
    1035
    1055
    1058
    1077
1094  KLINIDANKQYQKWDGEGVVCLLGDEEKYVDISSENNRIQLVNSKDTAKRIIFNNDIFMP
    |---|
    1122
1154  NCLTFAYNNKYLSSLDRNRYNNMMICNNNDNIPKAAHLWALKGI
    |---|
    1164
    1174
-----
1 match found in sequence:
O50596 : ORF-X2 (Fragment).
(from "bt_spt.pep")
TOIG of: O50596 check: 1868 from: 1 to: 51

ID O50596 PRELIMINARY; PRT; 51 AA.
AC O50596;
DT 01-JUN-1998 (TREMBlrel. 06, Created)
DT 01-JUN-1998 (TREMBlrel. 06, Last sequence update)
DT 01-NOV-1998 (TREMBlrel. 08, Last annotation update)
DE ORF-X2 (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type A Kyoto-F;
RX MEDLINE=98126542; PubMed=9465394;
RA Kubota T., Yonekura N., Hariya Y., Isogai E., Isogai H., Amano K.,
RA Fujii N.;
RT "Gene arrangement in the upstream region of Clostridium botulinum type
RT E and Clostridium butyricum BL6340 progenitor toxin genes is different
RT from that of other types.";
RL FEMS Microbiol. Lett. 158:215-221 (1998).
DR EMBL; AB004778; BAAJ4886.1; -.
FT NON_TER 51
SQ SEQUENCE 51 AA; 5998 MW; 834EB4A69DD1157F CRC64;

O50596 Length: 51 September 1, 2004 07:07 Type: P Check: 1868
Found using 'seq23' (hayes346.key)

1 MNLKPFIYDWMKKTILKNAKESYSINEIIPKTFPMELHGTKITNSTLNGT
  9 12
-----
4 matches found in sequence:
O50597 : ORF-X1.
(from "bt_spt.pep")
TOIG of: O50597 check: 1145 from: 1 to: 142

ID O50597 PRELIMINARY; PRT; 142 AA.
AC O50597;
DT 01-JUN-1998 (TREMBlrel. 06, Created)
DT 01-JUN-1998 (TREMBlrel. 06, Last sequence update)
DT 01-NOV-1998 (TREMBlrel. 08, Last annotation update)
DE ORF-X1.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type A Kyoto-F;
RX MEDLINE=98126542; PubMed=9465394;
RA Kubota T., Yonekura N., Hariya Y., Isogai E., Isogai H., Amano K.,
```


61 GEGPHVPLKCTIDNGYLEIYNTSSSEKSLRDIETKVCMSIKPNSDGTSLCKNSFYIKT
76 79

121 NSLKLSEDRLLSHCLDKLILAWFKDNKHYLELFNRRIRTRVGGDLSLLGWDTIESSVS
150

181 YKTMNEFIKNDLYEKKPHQYMEVRNEYTIDGEPGPMQMTTGAD
201

4 matches found in sequence:

o52975 ; ORF-X1.

(from "bt_spt.pep")

TOIG of: o52975 check: 8196 from: 1 to: 144

ID O52975 PRELIMINARY; PRT; 144 AA.

AC O52975;

DT 01-JUN-1998 (TrEMBLrel. 06, Created)

DT 01-JUN-1998 (TrEMBLrel. 06, Last sequence update)

DT 01-NOV-1998 (TrEMBLrel. 08, Last annotation update)

DE ORF-X1.

OS Clostridium botulinum.

OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

OC Clostridium.

OX NCBI_TaxID=1491;

RN [1]

RP SEQUENCE FROM N.A.

RC STRAIN=type E Iwanai;

RX MEDLINE=98126542; PubMed=9465394;

RA Kubota T., Yonekura N., Hariya Y., Isogai E., Isogai H., Amano K.,

RA Fujii N.;

RT "Gene arrangement in the upstream region of Clostridium botulinum type E and Clostridium butyricum BL6340 progenitor toxin genes is different from that of other types.";

RL FEMS Microbiol. Lett. 158:215-221(1998).

DR EMBL; D88418; BAA24880.1; -.

SQ SEQUENCE 144 AA; 16767 MW; 3A4F7DB7F67670BC CRC64;

O52975 Length: 144, September 1, 2004 07:07 Type: P Check: 8196 ..
Found using 'seq23' (hayes346.key)

1 MELKQAFVFEFDENLSSSSGSIHLEKVKQNCSPNYDYFKITFDGYIYIKKSGVILDKY
35 38 46 49
37 40

61 DLKNVISLVALKRDYLSLSNNKQIKKFNKHLKNKFNLYVINEDIEKRITKNGIL
75 78

121 EEVILNKM

...

7 matches found in sequence:

o52976 ; P-47.

(from "bt_spt.pep")

TOIG of: o52976 check: 6544 from: 1 to: 416

ID O52976 PRELIMINARY; PRT; 416 AA.

AC O52976;

DT 01-JUN-1998 (TrEMBLrel. 06, Created)

DT 01-JUN-1998 (TrEMBLrel. 06, Last sequence update)

DT 01-OCT-2001 (TrEMBLrel. 18, Last annotation update)

DE P-47.

OS Clostridium botulinum.

OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

OC Clostridium.

OX NCBI_TaxID=1491;

RN SEQUENCE FROM N.A.
RX MEDLINE=98126542; PubMed=9465394;
RA Kubota T., Yonekura N., Hariya Y., Isogai E., Isogai H., Amano K.,
RA Fujii N.;

RT "Gene arrangement in the upstream region of Clostridium botulinum type E and Clostridium butyricum BL6340 progenitor toxin genes is different from that of other types.";

RL FEMS Microbiol. Lett. 158:215-221(1998).

[2]
RN SEQUENCE FROM N.A.
RA Li B., Qian X., Sarkar H.K., Singh B.R.;

RT "Nucleotide-derived amino acid sequence of a putative transcriptional regulatory protein of botulinum neurotoxin gene from type E Clostridium botulinum.";

RL Submitted (SEP-1996) to the EMBL/GenBank/DBJ databases.

DR EMBL; D88418; BAA24880.1; -.

DR EMBL; U70780; AAD09562.1; -.

SQ SEQUENCE 416 AA; 47717 MW; 8FD56218981D94E2 CRC64;

O52976 Length: 416, September 1, 2004 07:07 Type: P Check: 6544 ..
Found using 'seq23' (hayes346.key)

1 MNTYGVWDIVGCSNRVNVNKLKNYIDENKIEFLYSDINKKQEKIMIFDNWEIINGGTSNF
34 37

61 LRIKIFKEGYFKFRNTTVDSGVIPILEIKLDPFNDSNPHIKELKFSFGNKTNDIDKV
71 74

121 IVSDLSGLYEEDEFYFNKLISAFINNEKQSVYIFASLAVTSNIVWMNPKQKPYVYSP
154

181 TDNDGYLCILSVVTVNRDISKLSNTVDSSILSENSEVGLLISEKLFMENLLPKLSSNMG
187

241 SNITSNFNVINTSDTTGIKKNKNTLNWYIKVAALYYYPINDFSMELFEGNKLKTRLS
279

301 GIVKLTGYERYIKLNWECITKFIYDNKNKYSFEIYSTPIMECRPIFGLLDGIPAFAVAK
308 312

361 SVGNW

...

7 matches found in sequence:

o52977 ; P-47.

(from "bt_spt.pep")

TOIG of: o52977 check: 8222 from: 1 to: 416

ID O52977 PRELIMINARY; PRT; 416 AA.

AC O52977;

DT 01-JUN-1998 (TrEMBLrel. 06, Created)

DT 01-JUN-1998 (TrEMBLrel. 06, Last sequence update)

DT 01-NOV-1998 (TrEMBLrel. 08, Last annotation update)

DE P-47.

OS Clostridium butyricum.

OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

OC Clostridium.

OX NCBI_TaxID=1492;

RN [1]

RP SEQUENCE FROM N.A.

RC STRAIN=BL6340;

RX MEDLINE=98126542; PubMed=9465394;

```

RA Kubota T., Yonekura N., Hariya Y., Isogai E., Isogai H., Amano K.,
RA Fujii N.;
RT "Gene arrangement in the upstream region of Clostridium botulinum type
RT E and Clostridium butyricum BL6340 progenitor toxin genes is different
RT from that of other types.";
RL FEMS Microbiol. Lett. 158:215-221(1998).
DR EMBL; D88419; BAA24883.1; --
SQ SEQUENCE 416 AA; 47786 MW; 15798BEE2133755A CRC64;

O52977 Length: 416 September 1, 2004 07:07 Type: P Check: 8222 ..
Found using 'seq23' (hayes346.key)

1 MNTYGDIVGCSNRVNVKHLKNYIDENKTEFLYSDINKKQEIKWIFDNWEIINGSSNF
34 37
61 LRIKIFIREGVFKPNTTVDLSGVIPILEIKLDFNDTSNFIYKELKPSFGNKTNDNIKV
71 74
121 IVDSLQQLVEDEFYFNKLLISAFINNEKQSVIFASLNTSVNIWMNPKQFKFVYVSP
154
181 TDNDGVLCLISVVNTRDISKLTNVDSILSENSEVGLLISEKLFMENLLPKLSSNMG
187
241 SNITSNFNVTSDTTGIKKNKTLNWGIKVAALYYIYIPEINDFSMELFEGNKLKTRLS
279
301 GIVKLTGYRIYKLNMECITKFIYDNKNKVSFIYTPIMECRPIFGLLDGPAAVAK
308 312
361 SVGNW

...

7 matches found in sequence:
O69275 ; C2 toxin (Component I).
(from "bt_spt.pep")
TOIG of: O69275 check: 8342 from: 1 to: 431

ID O69275 PRELIMINARY; PRT; 431 AA.
AC O69275;
DT 01-AUG-1998 (TrEMBLrel. 07, Created)
DT 01-AUG-1998 (TrEMBLrel. 07, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE C2 toxin (Component I).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=92-13;
RX Hofmann F., Barth H., Aktories K.;
RA "Submitted (MAR-1998) to the EMBL/GenBank/DBJ databases."
RT "Clostridium botulinum DNA for C2 toxin (component-I), complete cds.";
RL EMBL; A224480; CAA11969.1; --
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; P:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003540; B:binary_toxin.
DR Pfam; PF03496; B:binary_toxin.
DR PRINTS; PR01390; B:BINARYTOXIN.
SQ SEQUENCE 431 AA; 49313 MW; 9CB348771CE038A8 CRC64;

O69275 Length: 1161 September 1, 2004 07:07 Type: P Check: 5699 ..
Found using 'seq23' (hayes346.key)

...

51 TKTDNFSTDLFSSSLTAIEIMKEDENHNFDFVEREALLKNTLDRDAIGVYVNFPTPKELG
101
111 INFSDRVELNRDISDELDKVRQIINQBYTKFSPFISLGLNDNSINESVPVIVKTRVPT
141
171 TFDYGVINDKETVSLLLNQFSIIPESAIITITKGDYIILIEGSLSOELDFYNGKSEAWG
174
231 AENVGDYISKLSHEQLGALSGYLHSDYKAINSYLNNRVFNNDELNKKIELISSALSVPK
234 257
291 IPQTLIAYRVGDGIPFDLPSPDFSKKENGELIADKQKLNFEIDKWTGKEIENLSPSSTS
298
351 L

...

26 matches found in sequence:
O69276 ; Nontoxic-nonhaemagglutinin.
(from "bt_spt.pep")
TOIG of: O69276 check: 5699 from: 1 to: 1161

ID O69276 PRELIMINARY; PRT; 1161 AA.
AC O69276;
DT 01-AUG-1998 (TrEMBLrel. 07, Created)
DT 01-AUG-1998 (TrEMBLrel. 07, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Nontoxic-nonhaemagglutinin.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organisation and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain
RT NCTC 2916.";
RL NCTC 2916;
RN [2]
RP Curr. Microbiol. 36:226-231(1998).
RC SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; Y14238; CAA74630.1; --
DR GO; GO:0008233; P:peptidase activity; IEA.
DR GO; GO:0015070; P:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; C:ConA like lec gl.
DR InterPro; IPR000395; P:peptidase_M27.
DR Pfam; PF01742; P:peptidase_M27; I.
DR PRINTS; PR00760; B:ONTOXIDIN.
DR ProDom; PD001963; B:ONTOXIDIN.
SQ SEQUENCE 1161 AA; 135221 MW; 0F67D2613E5B6F74 CRC64;

O69276 Length: 1161 September 1, 2004 07:07 Type: P Check: 5699 ..
```

Found using 'seq23' (hayes346.key)

```
...
81  ATVKILQRIINNVIGAKLLSLISTAIPFPYRAEDYRQTYLSSKONQHYITANLVIFG
    |---|
    131
141  PGTNIVENVVYVKEDSKNGMTSEIWFPFLTYKYDQFYVDPFALELIKLSIYYL
    |---|
    178
201  YGKPNDDLSPYLRSEFNSLEYSELDMDVDFLISGGTDYKLLNTNPFYFTDNVFINAPX
    |---|
    224
261  NPEKYKNDYETKIKNNNDIANISKLYLEQKFTNVQDIWELNLSYFSTEFEMPEIFNN
    |---|
    330
321  ALNHYHRKEYVYDYPFNYNINGFIQIKTILPLSKYKNKIINKPELIVNLINENNSVL
    |---|
    398
381  MKNYIGDGLKDTIGNFYAVYKIPYNGIDYHINSSDCLDNVDIKEIDNIPPINDADIY
    |---|
    471
441  PYRKNCDPPTPVYNITETKEINTTIPFPVNYLQAVTNSNDINLSDFLKVISSKORSIV
    |---|
    501
501  YSFLDNTIDYLSIKYDGPIDTDKTYLWLKEIFRNVSPDITATQEIINTDGINKVVTFW
    |---|
    526
527
561  GKALNLTSDSFVEEFQNL
    |---|
    645
645
643  QYYSQYFDLICKAKRSVLAQESLIKKIQQKLSYLGNSNISDNLALMLTTNLTLDI
    |---|
    648
703  SNESQIANNVNNFLNVAICVFQTNIPKFLSPFMEQCINNKNKNTREFIQKCTNITENE
    |---|
    730
763  KLQINQNISSLDPDFLNIENLKSLENSETGLIKEETSPYELVLYAFQBPQNNAIQDA
    |---|
    804
823  SGKNTSIEYSKDIGLVYGINSDALYNGSNQSISSPNDFFENGLTNSFSIYVFLNLCKD
    |---|
    873
883  TIKSKLGSKEDNCWEIYFQDTGLVFNMDISNGNEKNIYLSDVSNNSWHYITISVDRLK
    |---|
    933
943  EQLLIFIDNVLVANEIKELIINLYSSNTISLVNENNPYVBSLILNKFTTSQEVLSNYF
    |---|
    1001
```

```
1003  KVLNNSYIRDSSEERLEYNTQYLYNIVFSENPYIEIKQNNIYLTNTNNLNLQVSKF
    |---|
    1004
    1024
    1027
1063  KLLSINPNKQYVQKLDEVIIISVLDNMEKYIDISEDNRLQLIDNKNNAKMTIISNDIFISN
    |---|
    1091
1123  CLIIISYNGKVICLSMKDENHNWMCNNDMSKYLILWSEFK
    |---|
    1132
    1154
-----
28 matches found in sequence:
069277 ; Nontoxic-nonhaemagglutinin.
(from "bt_spt.pap")
TOIG of: 069277 check: 574 from: 1 to: 1198

ID 069277 PRELIMINARY; PRT; 1198 AA.
AC 069277;
DT 01-AUG-1998 (T-REMBLrel. 07, Created)
DT 01-AUG-1998 (T-REMBLrel. 07, Last sequence update)
DT 01-OCT-2003 (T-REMBLrel. 25, Last annotation update)
DE Nontoxic-nonhaemagglutinin.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RC STRAIN=NTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organisation and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain
RT NCTC 2916."
RL Curr. Microbiol. 36:226-231 (1998).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=NTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; Y14239; CAA74634.1;
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; C:alpha-like lec gl.
DR Pfam; PF01742; Peptidase M27.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1198 AA; 138424 MW; 8DA6F6C815009D0B CRC64;

069277 Length: 1198 September 1, 2004 07:07 Type: P Check: 574
Found using 'seq23' (hayes346.key)

...
60  DGGYDSNFLSQDSEKDFLQAIITLLKRINSTNAGEKLLSLISTAIPFPYGYIGGYA
    |---|
    110
120  PNMTFSGAPKSNKKLNSLISSTIPFYAGYRETNYLSSDNKSFYASNIVIFGPGANIV
    |---|
    147
180  ENNTVFYKEDAENGMTWTEIWFPQFLTYKDYFDPALELIKLSLYFLYGIKPS
    |---|
    231
```

```

-----
9 matches found in sequence:
085760 ; ABC translocator (Fragment).
(from "bc_spt Pep")
TOIG of: 085760 check: 2577 from: 1 to: 545

ID 085760 PRELIMINARY; PRT; 545 AA.
AC 085760;
DT 01-NOV-1998 (TrEMBLrel. 08, Created)
DT 01-NOV-1998 (TrEMBLrel. 08, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ABC translocator (Fragment).
GN BRCCT.
OS Brochothrix campestris.
OC Bacteria; Firmicutes; Bacillales; Listeriaceae; Brochothrix.
OX NCBI_TaxID=2757;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC43754;
RX MEDLINE=99054910; PubMed=9835559;
RA McCormick J.K., Poon A., Sailer M., Gao Y., Roy K.L., McMullen L.M.,
RA Vederas J.C., Stiles M.E., Van Belkum M.J.;
RT "Genetic characterization and heterologous expression of brochothrix-
RT an antitoxin, two-peptide bacteriocin produced by Brochothrix
RT campestris ATCC 43754."
RL Appl. Environ. Microbiol. 64:4757-4766 (1998).
DR EMBL; AF075600; AAC95142.1; -.
DR MEROPS; C39.001; -.
DR GO; GO:0016021; C: integral to membrane; IEA.
DR GO; GO:0005524; F: ATP binding; IEA.
DR GO; GO:0004009; F: ATP-binding cassette (ABC) transporter acti. .; IEA.
DR GO; GO:0008233; F: peptidase activity; IEA.
DR GO; GO:0019534; F: toxin transporter activity; IEA.
DR GO; GO:0006508; P: proteolysis and peptidolysis; IEA.
DR GO; GO:0006810; P: transport; IEA.
DR InterPro; IPR005897; ABC_bact_transpt.
DR InterPro; IPR01140; ABC_TM_transpt.
DR InterPro; IPR005074; Peptidase_C39.
DR Pfam; PF00664; ABC membrane; 1.
DR Pfam; PF03412; Peptidase_C39; 1.
DR TIGRFAMs; TIGR01193; bact_toxins; 1.
FT NON TER 545
SQ SEQUENCE 545 AA; 878E08D295998B00 CRC64;

085760 Length: 545 September 1, 2004 07:07 Type: P Check: 2577
Found using 'seq23' (hayes346.key)

...
45 QGTSALGLVCALETGLGFESEVYQTDSTIWKEESLIPFIAHVVDKSFHYVVIYGYKNG
95 98
105 KILLADPAKGLTKTDFEGKWTGIVLSTSTPNYKAIRDSSHGFLYPLLLKQKKMI
140
165 MAIIFLSVLTCGIVGSYFQIIDDKIIPNSINLLSIISILLTIYITQAILQYIKQY
184
225 FLIKGQRLSSIIIMLGYFRHVLRLPMNFFSTRKSGEIIISRFLDATKVIDALANSTLSFL
227
285 DVSMILLIIGASLFIQNNLLFLISFTTVPYITLVVYVFIKPFNOSNEEQLEAGAVLNSHII
314 319
345 ESLKGIETIKSFNATDQIYSNLIKQDFQDMVMVSKLKKENLDNLQANLKWALQATSTTILW
363

-----
240 DDLVIPYRLRSELENTEYSQNLIVDLLVSGGIDPKFINTDPPYWFIDNYPNSNAKVPFEDHR
257
300 NIYETEIEGNAIGNDIKRLKQKFRININDIWELNINYPSEKFSIMMPDRFNALKHGFY
363
360 RKQYKIDYPENYSINGFVNGQINAOQLSDRNQDIINKPEEIIINLLGNVNSLMRSNIY
431
420 GDGLKSTVDDFYSNYKIPNRYAYEYHFNNSDSSLDNVNIGVIDNIPEDIDVNPYKENC
503
480 KFGPVQKITSTREINTNIPWPINYLQQAQNTNNEKFLSSDFVEVSSKDKSLVYFSLNV
558
540 MFYLDISKDNPIDTDKKYILWLRBEIFRNYSFDITATQETINTDCGINKVTVFGKALNIL
559
600 NTSDSFVEEFQNL
...
615 ISLINKENLSMPKIEIDEIFNSMLNLSFKDLSENLFNIPSKNNSYFEKIYDFLDQWWT
665
675 QYYSQYFLICWAKRSVLAQESLIKKIQQKLSYLIGNSISSDNLALMLTNTTTLRLDI
677
735 SNESQIAMNNVNFNLNVAICVFQTNVYPKTFISFMEQCINNINKNTREFOKCTNITENE
762
795 KLQLINQIFSLDFDLMIENLKSLENSETGLLIKEETSPYELVLYAFQEPGNNAIGDA
836
855 SGKNTSIEYSKDIGLVGINSDALYINGNSQISFSNDFENGLTNSFSIYFWLRNLGKD
905
915 TIKSKLIGSKEDNCGWEIFYQDTGLVFNMDISNGNEKNIYLSDSVNSNWHYITISVDRLK
965
975 EQLLIFIDNLVANESIKEILNIYSNTISLNVNPNPIYVEGLSILNRSITSEEVVNNYF
1033
1035 TYLNNSYIRDISGERLEYNKTYELNYVPFESSLYEVTENNIYLSLKNYNNLIQGAKE
1056
1095 KLINIDANKQYVQKWDGEGVCLLGDEKYYVDISSENNRIQLVSSKDTAKRIIFNNDIFRP
1123
1155 NCLTFAYNNKYLSLSDRNRYNNMNCNNNDNIPKAAHLWALKGI
1165

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405  IGTSLVKQSGISGLITNLYNMAVFTTFLQNIINLVQKIQAQVANDRLNIEFVLEQRH
      |---|
      423
465  LCEDSILSLSTS
...
-----
12 matches found in sequence:
086171 ; C2 toxin (Component-II).
(from "bt_spt.pep")
TOIG of: 086171 check: 3459 from: 1 to: 721

ID 086171 PRELIMINARY; PRT; 721 AA.
AC 086171
DT 01-NOV-1998 (TrEMBLrel. 08, Created)
DT 01-NOV-1998 (TrEMBLrel. 08, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE C2 toxin (Component-II).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type C;
RX MEDLINE=98323874; PubMed=9659689;
RA Kimura K., Kubota T., Ohishi I., Isogai H., Isogai E., Fujii N.;
RT "The gene for component-II of botulinum C2 toxin.";
RL Vet. Microbiol. 62:27-34(1998).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=type C;
RX MEDLINE=96184657; PubMed=8645309;
RA Fujii N., Kubota T., Shirakawa S., Kimura K., Ohishi I., Moriishi K.,
RA Isogai E., Isogai H.;
RT "Characterization of component-I gene of botulinum C2 toxin and PCR
RT detection of its gene in clostridial species.";
RL Biochem. Biophys. Res. Commun. 220:353-359(1996).
DR EMBL; D88982; BAA32537.1; -.
DR HSSP; P13423; IACC.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003896; Anthrax_toxinB.
DR Pfam; PF03495; Binary_toxB; I.
DR PRINTS; PR01391; BINARYTOXINB.
SQ SEQUENCE 721 AA; 80515 MW; 44C8153AC749D5F2 CRC64;

086171 Length: 721 September 1, 2004 07:07 Type: P Check: 3459
Found using 'seq23' (hayes346.key)

1  MLVSKFENSVMKSNKRNFTINGLMGYFPENDRFNLIISPTLDGNLTFSKEDINSILGNK
      |---|
      17 20
61  IIKSARWIGL
...
82  STNSPNCRVELNGEIFNLSTNTNTVNLIQGNVYDIRIEQLMSENQLLNKRYEGIKLYWET
      |---|
      132
142  SDIIEKIIPSEVLKPNYSNTNEKSKFIPNNTLFSNAKLIKANANRDTDRDGIPEDEWEING
      |---|
      151
202  YTVNMQKAVAWDKFAANGKYKVSNPFPKCTANDPYTDFEKVSGQIDPSVSWARDPMI
      |---|
      221
      238
      |---|

262  SAYPIVGQMERLVVSKSETITGDS TKSMKSTSHSTNINTVGAESGSLQAGG
      264
...
362  INPNIRYNTGTAPVYNTPTTTTVIDKQSVATIKQBSLIGDYLNPGGTVPICEPPWA
      |---|
      412
422  LNTMDQFSSRLIPINYNQLKSIDNGGTVMLSQFTGNFAKYNNGNLVTDGNNWGPYL
      |---|
      437
482  TIKSTTASL
...
576  HCLIKRNNILVKVITFKENISSINIINDTNFGVQSMGLSNRSKGODGIYRAATTAFSF
      |---|
      626
636  KSKELKYPEGRYMRFVIQSYEPFTCNFKLNNLIYSSSPDKGYDEFFFYFYNGSKSFF
      |---|
      656
      680 685
696  NISCDIINSINRLSGVFLIEDKLI
-----
6 matches found in sequence:
087709 ; P-47 protein (fragment).
(from "bt_spt.pep")
TOIG of: 087709 check: 8679 from: 1 to: 413

ID 087709 PRELIMINARY; PRT; 413 AA.
AC 087709
DT 01-NOV-1998 (TrEMBLrel. 08, Created)
DT 01-NOV-1998 (TrEMBLrel. 08, Last sequence update)
DT 01-MAR-2003 (TrEMBLrel. 23, Last annotation update)
DE P-47 protein (fragment).
GN P-47.
OS Clostridium baratii.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1561;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 43256;
RX MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hiem S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic & non-proteolytic Clostridium botulinum and Clostridium
RT baratii.";
RL Curr. Microbiol. 37:262-268(1998).
DR EMBL; Y12091; CAA72806.1; -.
DR InterPro; IPR001064; Crystallin.
DR PROSITE; PS00225; CRYSTALLIN_BETAGAMMA; 1.
FT NON TER 1
SQ SEQUENCE 413 AA; 47516 MW; 815074AF34FC17DA CRC64;

087709 Length: 413 September 1, 2004 07:07 Type: P Check: 8679
Found using 'seq23' (hayes346.key)

...
101  KKLKFNFSGSDDDIKIIVSDINGKLQDEEFFFNKLLIEAFINNKEVISYIFARLIES
      |---|
      151
161  NIEWNNQKFKFSYSPDTSNGALFILSVVTNRDISKLSTNVD
      |---|
      151
```

seq23spt.res

Thu Sep 2 08:56:12 2004

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261 NFEKYKNYETVKYNNNDISNSIKLYEQKFTNVQDIWELNLSYFSEKPEQIMPEYNN 318
    265
321 ALMHYKYYMIDYFKYNNISGFVNGQINTRPLSKYKNDIISKPELIVNLINENNTIL
    330
381 MKNISYGDGLKDRTNFYSNYKIPYSTNYEQINHSHSYNNVNNIEISNIPIDDKDIYPY
    398
441 RKNADSFIPYISASTKEITTTPLPYNLQAMTNNNNIKLSLDFEVLSSKGLSVYSFLN 451
    451
501 NTIDYLSIKYDKPINTAERYEYEWLKSIFRNYSPDITETQETINTSCGTTKVVPWIGKALN
    521
561 ILNTNNSFVEEFEKL
...
578 ISLINKENITMPKIEIDEIPNSMLNSFNDLSNNLNFNIYAKNNSYFKKIYFNLDQWNT
    628
638 QYQSYFYLICWGKKSVLAEKLIKETIQQLNLYLRNSNISSDLALMNLTTTTLRDI
    640
698 SNKSIAMNNIDDFNNAACVQFSNIYFKFISFMQCCINGINENTKYFIQKCTNVTEDE
    725
758 KLQIMQNSLNSLNFDFLDIEKIKLFSYTRLLIKKQSSPYELSYAFQGEDKNVIGDG
    787
818 SGKNTLVEYTNIDIGLYGINNNAALYLNQSNQSVFTNDYFENGTLNPSFYFWRNLGKD
    868
878 LIKSKLSSKLDNCGWEIYLEDNGLVFNIDNSNGSYKKIYISDMNNSWNYIALSVDRKE
    913
938 QLLIFVNDVLVANEDIKILNIYSSNTISLVSENNOICIEGLSILNTNITKBEVLNNYFA
    927
998 DLNNSYIRNGNEERLEYNNKYNLFNVYFSKTPICKVNNHNNKIYLSINDDNLNVKPLSFM
    1018
1058 LLSVDSNKYVQKDEVIISILDDKERYLCKSNEDNRIEIVDNKSSANIFIINDDIFISN
    1040
1118 CLTLKFNKPYLSEKYMNYNWIETECENKYTIPKKAYLWILKNI
    1134
-----
3 matches found in sequence:
087710 ; BoNT protein (Fragment) .
(from "bt_spt.pep")
TOIG of: 087710 check: 4235 from: 1 to: 49

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226 NLVLPKLSNMGSGISERNFQVISTSDTTAILKNSILNHWYGIKILWYYPRIKWFYLK 276
    276
286 PFEQKNIELMGSEVLSGEIYVADFSINSINKFIYDSRNKKAYPEIDNAKTDKILHI
    305
346 RPIDLPLAINSVAVWMSIKNALGFQLANNFDTIINDIVNNWNEFKISEVTNVIWNVG
    361
406 FCIQGRAN
-----
29 matches found in sequence:
087710 ; NTNH protein.
(from "bt_spt.pep")
TOIG of: 087710 check: 8868 from: 1 to: 1160
ID 087710 PRELIMINARY; PRT; 1160 AA.
AC 087710;
DT 01-NOV-1998 (TrEMBLrel. 08, Created)
DT 01-NOV-1998 (TrEMBLrel. 08, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE NTNH protein.
GN NTNH.
OS Clostridium baratii.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1561;
RN [1] SEQUENCE FROM N.A.
RC STRAIN=ATCC 43256;
RA MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hielm S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic & non-proteolytic Clostridium botulinum and Clostridium
RT baratii.";
RL Curr. Microbiol. 37:262-268(1998).
DR EMBL; Y12091; CAA72807.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; P:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontotoxilin; 1.
SQ SEQUENCE 1160 AA; 135776 MW; 75ACF3F2B4B7C534 CRC64;
087710 length: 1160 September 1, 2004 07:07 Type: P Check: 8868
Found using 'seq23' (hayes346.key)
...
81 ATKILQRINNIVGEKLLSLIATAMPFPVEYGAEDFRQTNLYSSKDNKYYPANLVIFG
    131
141 PGSNLIENSVCYKKEYSENGMTMCEVWFQPLTYKIDGFYNDPALELIKCLKLSLYL
    178
201 YGKIPSDLSIPYLRSEFNLEYSELDIIDFLISGNDYKFLNTNPFYWLTSDFYNASK
    221
    224
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ID AC 087711 PRELIMINARY; PRT; 49 AA.
DT 01-NOV-1998 (TREMBlrel. 08, Created)
DT 01-NOV-1998 (TREMBlrel. 08, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE BONT protein (Fragment).
GN BONT.
OS Clostridium baratii.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1561;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 43256;
RX MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hiem S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic & non-proteolytic Clostridium botulinum and Clostridium
RL baratii";
RL Curr. Microbiol. 37:262-268(1998).
DR ENBL; Y12091; CAA72808.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:coxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase.M27.
DR Pfam; PF01742; Peptidase.M27.
DR PRINTS; PR00760; BONTXILYISIN.
DR ProDom; PD001983; Bontoxilysin; 1.
FT NON_TER 49
SQ SEQUENCE 49 AA; 6056 MW; 1C221EB36E325878 CRC64;

087711 Length: 49 September 1, 2004 07:07 Type: P Check: 4235
Found using 'seq23' (hayes346.key)

1 MFVNNFNNDPNNNTTILYMKMPYEDSNKYKAFETMDNIWIIPER
21 24
33 36
34 37

-----
27 matches found in sequence:
p71107 ; Ntnh protein.
(from "bt_spt.pep")
TOIG of: p71107 check: 3832 from: 1 to: 1193

ID P71107 PRELIMINARY; PRT; 1193 AA.
AC P71107;
DT 01-FEB-1997 (TREMBlrel. 02, Created)
DT 01-FEB-1997 (TREMBlrel. 02, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE Ntnh protein.
GN NTNH.
OS Clostridium botulinum A.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36826;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR ENBL; X92973; CAA63550.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
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DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR000395; Peptidase.M27.
DR Pfam; PF01742; Peptidase.M27.
DR PRINTS; PR00760; BONTXILYISIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1193 AA; 138020 MW; DB4590A1EFD609A4 CRC64;

P71107 Length: 1193 September 1, 2004 07:07 Type: P Check: 3832
Found using 'seq23' (hayes346.key)

...
60 DGGYDSNFLSQDSEKDFLQAIITLLKRINSTNAGEKLLSLISTAIFPPKGYGGYYA
110
120 PNMITFGSAPKSNKKLNSLISSTIFFPYAGYRETNLYSSDNKSFYASNIIVFGGANIV
147
180 ENNTVFYKKEAENGMTWTEIWFQPFITYKDEFYIDPAIELIKLIKLSLYFLYGIKPS
211
240 DDLVIPYLRSELENIETYSQINIVDLLVSGGIDPKFINTDPYWFNTDNYFSNAKKVPEDHR
257
300 NIYETIEIGNN
...
313 GNDIKLRLLKQKFRININDIWLGLNLNLYFSKEFSIMPDFFNNALKHFYRKQYKIDYPENY
363
373 SINGFVNGQINAGLSLSDRNQDIINKPEEIIINLGNVSLMESNIYGDGLKSTVDFFYS
431
433 NTKIPYNRAYEYHFNNSSDLSLDNVNIGVIDNIPEIIDVNPYKENCDFKSPVQKITSTRE
434 438
493 INTNIPWPINYLQAOQNTNNEKFSLSDFVEVVSSKDKSLVYFSLSNVMFYLSIKDNSPI
503
553 DTDKKYLLWLREIPRNSYFDITATQETINTCGINKVVTWFGKALNLTNDSFVEEQML
558
559
...
615 ISLINKENLSMPTIESYEIENDMLGLFLNDLNEKLFNYSKNTAYFKIYVNFLDQWWT
665
666
675 QYYSQYFLICMAKRSVLAQETLIRIKIQKKLSYLGNSISDNLALMLNTTTNLTIRI
677
680
735 SNESQIAMNVDSFLNNAICVFESNIYPFSPMEQCINNINIKTEFIQKCTNINEDE
762
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795      KLQLINQVNSLDFEFLNIQNKKSLFSSETALLIKEETWPELVLYAYAKPQGNVIGDA      |--|      836
855      SGKNTSYEYKDIGLVYGINSDAILYNGSNQISFNSDFENGLTNFSFYFWLRNLGKD      |--|      905
915      TTKSKLIGSKEDNCGWEIYFQDTGLVFNMDISNGNEKNTYLSDSVSNNSWHYITISVDRLK      |--|      965
975      EQLLIFIDNNLVANESIKBELNIYSSNIISLSENNPFSYIEGLTILNKPTTSQEVLSNYF      |--|      1033
1035      EYVNNSYIRDSNEERLEYNKYTYQLYNYVFSKDPICEVKQNNNIYLTINNNTNNLNQASKF      |--|      1078
1059      1059
1095      KLLSNPNKQYQVKLDEVIIISVLDMKXYIDISEDNRLQLIDKNNNAKXMIISNDIFISN      |--|      1123
1155      CLTSLYNGKYICLSMKDENHNWMCNNDMSKYLWLSFK      |--|      1186
1164      1164
-----
25 matches found in sequence:
p71108 ; Nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: p71108 check: 4532 from: 1 to: 1193

ID      P71108      PRELIMINARY;      PRT;      1193 AA.
AC      P71108;
DT      01-FEB-1997 (TrEMBLrel. 02, Created)
DT      01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT      01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE      Nontoxic-nonhemagglutinin component.
OS      Clostridium botulinum.
OC      Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae
OC      Clostridium.
OX      NCBI_TaxID=1491;
RN      [1]
RP      PARTIAL SEQUENCE FROM N.A.
RC      STRAIN=7103-H;
RA      Kubota T., Fujii N.;
RL      Submitted (APR-1996) to the EMBL/GenBank/DBJ databases.
RE      [2]
RP      SEQUENCE OF 653-793 FROM N.A.
RC      STRAIN=7103-H;
RX      MEDLINE=96311376; PubMed=8713133;
RA      Kubota T., Shirakawa S., Kozaki S., Isogai E., Isogai H., Kimura
RA      Fujii N.;
RT      "Mosaic type of the nontoxic-nonhemagglutinin component gene in
RT      Clostridium botulinum type A strain isolated from infant botuli
RT      Japan."; Biochem. Res. Commun. 224:843-848 (1996).
RL      Biochem. Biophys. Res. Commun. 224:843-848 (1996).
DR      EMBL; D84289; BAA12299.1; -.
DR      PIR; JC4901; JC4901.
DR      GO; GO:0008233; F:peptidase activity; IEA.
DR      GO; GO:0015070; F:toxin activity; IEA.
DR      GO; GO:0009405; P:pathogenesis; IEA.
DR      GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR      InterPro; IPR008985; ConA_like_rec_gl.
DR      InterPro; IPR000395; Peptidase M27.
DR      Pfam; PF01742; Peptidase M27; 1.
DR      PRINTS; PR00760; BONTOXILYSIN.
DR      ProDom; PD001963; Bontoxilysin; 1.
DR      SEQUENCE 1193 AA; 137838 MW; F6807B86500C79E1 CRC64;
SQ

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1080 TTNNTNLLNQPSKFKLLSINPNKQYVQKLDEVIISVLGNMEKYIDISEDNRLQIDNKN 1078
1123
1140 GAKKMIISNDMFISNCLTSLSCGKGYICLSMKDENHNWMCNNDMSKYLWSPK 1056
1164
26 matches found in sequence:
p71109 ; Nontoxic-NONHEMAGGLUTININ (Partial P-21 gene and P-47 gene) (Strain
(from "bt_spt.pep")
TOIG of: p71109 check: 9160 from: 1 to: 1159
ID P71109 PRELIMINARY; PRT; 1159 AA.
AC P71109;
DT 01-FEB-1997 (TREMELrel. 02, Created)
DT 01-FEB-1997 (TREMELrel. 02, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Nontoxic-NONHEMAGGLUTININ (Partial P-21 gene and P-47 gene) (Strain
DE KYOTO-F).
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=KYOTO-F;
RA East A.K., Stacey J.M., Collins M.D.;
RL Submitted (OCT-1996) to the EMBL/GenBank/DBJ databases.
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=KYOTO-F;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RL Submitted (OCT-1996) to the EMBL/GenBank/DBJ databases.
DR EMBL; X87974; CAA61233.1; -.
DR EMBL; X96493; CAA65348.1; -.
DR GO; 0008233; F:peptidase activity; IEA.
DR GO; 0015070; F:toxin activity; IEA.
DR GO; 0009405; P:pathogenesis; IEA.
DR GO; 0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; Cona-like_rec_91.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1159 AA; 134868 MW; D8F46CF24DE92C56 CRC64;
P71109 Length: 1159 September 1, 2004 07:07 Type: P Check: 9160 ..
Found using 'seq23' (hayes346.key)
...
81 ATVKILQRINNVIGAKLLSLISTAIPFPYKPGDYROTNYLVSKDNQHYXTANLVIFG 131
141 PGTNIVENNAIYKKEDSNGMGTSWEIWFQPLTYKGFYVDPALELIKLSLYL 178
201 YGKPSDDLISFYRLRELSELSFEYSELDIMDELISGGTEYKLLDTNPYWFDTNYFDAPK 224
261 NFEKYNDYETKIKNNDIANSIKLYLEQFKTNAQDIWELNLSYFSTFEIIMPEIFNN 240
321 ALNHYYRKEYYVIDYFKNYNINGFINGQIKTILPLSKYKNKIINKPELVNLLINENNTVL 240

381 MKNVYGDGLKGTMDNFYAAKYKIPYINIGDEYHINYSYLNNVNVEEINNIPPINDADIYPY 398
415
441 RKNSDPPIPVYNITETKEINTTTPLSVNLYQAQVNTNSNDISLSSDFSKVSSKDRSLVYS 469
499
501 FLNNTIDYLDLSIKYDEPIDTDKKYYLWLKEIFRNSYFDMTETOEVNTPCGINKVVPWLIGK 524
525
561 ALNLTGNSFIEEPKSL
...
581 ISLINKENITWPKIBIDEIPNSMLNLSFKDLSNLFNRFKSNYSFEKIYDFLDQWWT 631
632
641 QYYSQYFDLICMAKXSILAQETLIKIIQKLSYLIGNSISSDNLALMLNTTNTLRDI 643
646
701 SNESQIAMNNVDSFLNSAAICVFEFGNIYSKFTSFMEQCINNKNKTREFIQKCTNITENE 728
761 KLQLINQNTFSSLDFFLNIENLKSLFSSETALLIKEETSPYELVLYAFQEPDNNAIGDA 802
821 SAKNTSIEYSKDIIDLVIYGINSDALYINGSNQISPSNDFENGLTNSFYIYFWLRLGKD 871
881 TIKYKLIGSKEDNCGWEIFYQDTGLVFNMDISNGNEKNIYLSVDSVNSWHYITISVDRLK 884
931
941 EQLLIFIDDLNVANESIKEILNIYSSNIISLSENKPSYIEGLTILNKPTTSQEVLLNYYF 999
1001 KYLNNSYIRDSNEERLEYHKTYQLDNYVFSKDPICEVKQNNNIYLTNTNNLNLPQSKF 1002
1044
1061 KLLSINSNKQYVQKFEDEVIISILGNMEKYIDISEDNRLQIDNKNKAKKMIISNDMFISN 1089
1121 CLTSLCGGKYICLSMKDENHNWMCNNDMSKYLWSPK 1152
1130

1 match found in sequence:
p71110 ; P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: p71110 check: 214 from: 1 to: 116
ID P71110 PRELIMINARY; PRT; 116 AA.
AC P71110;
DT 01-FEB-1997 (TREMELrel. 02, Created)

```

DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Chiba-H;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96491; CAA65345.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
FT NON_TER 1 1
FT NON_TER 116 116
SQ SEQUENCE 116 AA; 13890 MW; B9AB5089B3C711F CRC64;

P71110 Length: 116 September 1, 2004 07:07 Type: P Check: 214 ..
Found using 'seq23' (hayes346.key)

...

41 MKNRDKKIYNSBITDINLNLIQDSCFNDFEFKDLISILPNTQONIIYMKFFKDMKD
91 94

101 IDIAKKLKISRQSIYK

-----
1 match found in sequence:
P71111 ; P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: P71111 check: 146 from: 1 to: 116

ID P71111 PRELIMINARY; PRT; 116 AA.
AC P71111;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 9837;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96492; CAA65346.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
FT NON_TER 1 1
FT NON_TER 116 116
SQ SEQUENCE 116 AA; 14006 MW; 3035686269E3962 CRC64;

P71111 Length: 116 September 1, 2004 07:07 Type: P Check: 146 ..
Found using 'seq23' (hayes346.key)

...

```

```

41 MKNRDKKIYNSBITDINLNLIQDSCFNDFEFKDLISILPNTQONIIYMKFFKDMKD
91 94

101 IEIAKKLKISRQSIYK

-----
4 matches found in sequence:
P71112 ; P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: P71112 check: 7664 from: 1 to: 159

ID P71112 PRELIMINARY; PRT; 159 AA.
AC P71112;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kyoto-F;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96493; CAA65347.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
FT NON_TER 159 159
SQ SEQUENCE 159 AA; 19336 MW; EFF367CE90543904 CRC64;

P71112 Length: 159 September 1, 2004 07:07 Type: P Check: 7664 ..
Found using 'seq23' (hayes346.key)

1 MKNLFLLMNTLKDDNKKFEDIIYMKYKDLIDIFIKKYNLSYNDILKHFILIKADLNK
22 25 42 45

61 FNTENDLNKIYSKLCRYCISCMKKNRDKKIYNSBITDINLNLIQDSCFNDFEFKDL
134

121 LISILPNTQONIIYMKFFKDMKMDIADIAKKLKISRQSVYK

-----
8 matches found in sequence:
P71113 ; P-47 protein.
(from "bt_spt.pep")
TOIG of: P71113 check: 9356 from: 1 to: 416

ID P71113 PRELIMINARY; PRT; 416 AA.
AC P71113;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-DEC-2001 (TrEMBLrel. 19, Last annotation update)
DE P-47 protein.
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kyoto-F;

```

RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96493; CAA65349.1; -;
SQ SEQUENCE 416 AA; 47476 MW; 749EB3877C4A9D2E CRC64;

P71113 Length: 416 September 1, 2004 07:07 Type: P Check: 9356 ..
Found using 'seq23' (hayes346.key)

1 MNTYGWDIVYGCSKRVNKHKEYITKNIIQIYLSNIDKKQEIKNVFDNWEIINGSSNF
34 37
61 LAIKTPIKEGYFKVRNTTVLDSGINPVLRIKLDFFNDISNPNIKELKFNFGSNDIDI
71 74
121 IVSDINGNLQEDDEFYFNKLLINAFITONEKQISYIFASLNVTSDEIWMNPKQKPFVYISP
154
181 TDNSDGYLFILSVVNRDISKLSANVDGILGNNSVGLLISEKFLQNVLSRLSSNMG
187
241 SNINKNFEVISTDTGRVNNSTLNWYGLKVAALYYKPKINFSWQLFEGNKLISLR
279
301 GLVRLTGLEAVYSDFEIOISQNFVNSTNKKAYFEVDKNPTSSYKHLFPGLISLAVLS
312 333
361 SVTHWSIKSIEGALGFELINNFVLLINNTIKNNLKISQ
346
...

4 matches found in sequence:
P71114 : P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: P71114 check: 8589 from: 1 to: 159

ID P71114 PRELIMINARY; PRT; 159 AA.
AC P71114;
DT 01-FEB-1997 (TREMELrel. 02, Created)
DT 01-FEB-1997 (TREMELrel. 02, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Langeland NCTC 10281;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
RN [2]
RP SEQUENCE OF 392-416 FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organization and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain NCTC
RT 2916.";
RL Curr. Microbiol. 36:226-231(1998).
RN [3]
RP SEQUENCE OF 392-416 FROM N.A.
RC STRAIN=NCTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; X96494; CAA65351.1; -;
DR EMBL; Y14238; CAA74629.1; -;
SQ SEQUENCE 416 AA; 47420 MW; 1B132BE64075EC7D CRC64;

P71115 Length: 416 September 1, 2004 07:07 Type: P Check: 9982 ..
Found using 'seq23' (hayes346.key)

...
21 LKDYITKNKVEFLYSNTDKQEIKNVFDNWEIINGSSNFIKTPIKEGYFKVNTTID
71 74
81 LSGVNPVLEIKLDFNDISDPNIKLFNFGSNDIDKIIVSDINGKLQEDDEFYFNKL
141 LINAFIQNEKQISYIFASLNVTSDEIWMNPKQKPFVYSPVTSNDGYLFILSVVNRDIS

P71114 Length: 159 September 1, 2004 07:07 Type: P Check: 8589 ..
Found using 'seq23' (hayes346.key)

1 MEDLFFIIKILKDDNKKFEDIYVNYKNLIDIFIKKYNLSYNDILNHFIIILKKADLNK
22 25 28 42 45
61 ENTENDLNKYISKLCRYCLSIKMKNRDKKIYINSEITNINLNLIQDNCFNDEIEPFKD
121 LISILENTQNIIMKPFKMDKIDQIAKKLKISRQSYK
134

6 matches found in sequence:
P71115 : P-47 protein.
(from "bt_spt.pep")
TOIG of: P71115 check: 9982 from: 1 to: 416

ID P71115 PRELIMINARY; PRT; 416 AA.
AC P71115;
DT 01-FEB-1997 (TREMELrel. 02, Created)
DT 01-FEB-1997 (TREMELrel. 02, Last sequence update)
DT 01-NOV-1998 (TREMELrel. 08, Last annotation update)
DE P-47 protein.
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Langeland NCTC 10281;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B, and F: evidence of chimeric sequences in the gene
RT encoding the nontoxic nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
RN [2]
RP SEQUENCE OF 392-416 FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organization and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain NCTC
RT 2916.";
RL Curr. Microbiol. 36:226-231(1998).
RN [3]
RP SEQUENCE OF 392-416 FROM N.A.
RC STRAIN=NCTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; X96494; CAA65351.1; -;
DR EMBL; Y14238; CAA74629.1; -;
SQ SEQUENCE 416 AA; 47420 MW; 1B132BE64075EC7D CRC64;

P71115 Length: 416 September 1, 2004 07:07 Type: P Check: 9982 ..
Found using 'seq23' (hayes346.key)

...
21 LKDYITKNKVEFLYSNTDKQEIKNVFDNWEIINGSSNFIKTPIKEGYFKVNTTID
71 74
81 LSGVNPVLEIKLDFNDISDPNIKLFNFGSNDIDKIIVSDINGKLQEDDEFYFNKL
141 LINAFIQNEKQISYIFASLNVTSDEIWMNPKQKPFVYSPVTSNDGYLFILSVVNRDIS

```

154
187
201 ELSVNVDSNIGLNNSVEGLLISEKFLKLVLPKLSNMGSDITSNNFKVISTSDTTGRI
261 ANNSTLNWYGIKVLWYDKINNFSMELFEGNKLKTKLSGIVRLTGYRIYSELNLECT
279
308 312
321 TKTIYDPKKNKTSFEYVKTSIMS CRPIFGLLDGVPA LVAKSVGDW
...
-----
25 matches found in sequence:
p71117 ; Nontoxic-nonhemagglutinin.
(from "bt_spt.pap")
TOIG of: p71117 check: 4166 from: 1 to: 1197

ID P71117 PRELIMINARY; PRT; 1197 AA.
AC P71117;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Nontoxic-nonhemagglutinin.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112 (1996).
DR EMBL; X78230; CAA55074.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like lec_gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOLIXYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1197 AA; 138760 MW; 86D6230486B8CCDB CRC64;

P71117 Length: 1197 September 1, 2004 07:07 Type: P Check: 4166 ..
Found using 'seq23' (hayes346.key)

...
60 DGGYDSNLSQDSEKDFLQAIITLLKRINSTNAGEKLLSLIATAFPFYGGYYA
110
120 ENMITFGSAPSKNKLNSLISSTIPFVAGYRETNVLSSEDNKSFPYASNVIFGPGANIV
147
180 ENNTVFYKKEDAENGMTWTEIFQPFLLTKYDFYDIPATIELIKLKSIFYLYGIKPS
211
231
240 DDLVTPYLRSELENIEKSLQNLVLLVSGGIDPKFINTDPYWFDTNYSNAKKVPEDHR
257
300 NIYETQIEGNN

```

26 matches found in sequence:

Q08077 ; BONT/B.
(from "bt_spt.pep")
TOIG of: Q08077 check: 5240 from: 1 to: 1291

ID Q08077 PRELIMINARY; PRT; 1291 AA.
AC Q08077;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE BONT/B.
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Eklund 17B ATCC25765;
RX MEDLINE=94122659; PubMed=7764370;
RA Hutson R.A., Collins M.D., East A.K., Thompson D.E.;
RT "Nucleotide sequence of the gene coding for non-proteolytic
RT Clostridium botulinum type B neurotoxin: comparison with other
RT clostridial neurotoxins.";
RL Curr. Microbiol. 28:101-110(1994).
DR EMBL; X71343; CAA50482.1; -.
DR PIR; I40631; I40631.
DR HSP; P10845; 3BTA.
DR MEROPS; M27_002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M.Zn_BS.
DR Pfam; PF01742; Peptidase M27; I.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; I.
DR PROSITE; PS00142; ZINC PROTEASE; I.
SQ SEQUENCE 1291 AA; 150513 MW; 71BCAFE23D69FAAA CRC64;

Q08077 Length: 1291 September 1, 2004 07:07 Type: P Check: 5240
Found using 'seq23' (hayes346.key)

1 MEVTINNFNDPIDNDNIIMPEPPFARGTGRYKAFKITDRIWIIPERYTFGYPEDFN
33 36
34 37

61 KSSGIFNRDVCYEDPDYLTNTDKNI
...

149 ERKKGIFANLIIFGPGVLNENETIDIGIQNHAFSREGFGIMQMKFCPEYVSFNNVOE
199

209 NKGASIFNRRGYFSDPALILMELIHVLHGLYGIKVDDLPVINEKKFFMQSTDTIQARE

269 LYTFGGQDPSIIISPSTDKSIYDKVLQNFGRVDRNLKVLVCISDPNININIKYKFKDKY
289

329 KFEVDESGKYSIDVSEFNKLYKSLMGLFTEINIAENYKIKTRASYFSDSLPPVKIKNLLD
331
349

389 NEITYIEEGFNISDKMGKEYRGQNKAINQAYEISKEHLAVYKIQMCKSVKVPFGICID

449 VDNEFLFIADKNSFSDLSKNERVE 421
...

520 VYEKQPAKKVFTDENTIFQYLYSQTFPLNIRDILSTSFDDALLVSSKVYSPFSMDYIK 570

580 TANKVVEAGLFAGVVKQIVDDFVIEANKSSTMDKIADISLIVPIYIGLALNVGDEDTAKGNF 623

640 ESAFETAGSSILLEFIPELLIPVVGVFLLSEYIDNKNKIITIDNALTKEVKEWIDMYGL 697

700 IVAQMLSTVNTQFTYTIKEGMYKALNYQAQALEEIIKYKKNYIYSEEEKSNININFNINDINSK 738
700 720 738

760 LNDGIGNQAMNDINDFINECSVSYLMKKMIPLA
...

793 KKLDFDNTILKKNLNVIDENKLYLIGSVEDEKSKVDKYLKTIIPFDLSTYSNIEILIKI 843

853 FNKNSEILNIIILNRYRDNLDLISGYCAKVEVDGVKLDKNQFKLTSSADSKIRVT 888

913 QNQNIIFNSMFLDFSVFWIRIPKYRNDIOIYHNEYTIINCMKNNGWKISIRGNRII 950

973 WTLIDINGKTSVFFEYNIREDISYINRWF
...

1008 TNNLDNAKIYINGTLNESNMDIKDIGEIVNGEITFKLDGVDVDRTOFIWKKYFSIFNTQLN 1058

1068 QSNIKELIYKIQSYSEYKDFWGNPLMYNKEYWFMAGNKNYSIKLVKDSVGEILIRSKY 1080
1080 1098 1109

1128 NQNSNYINRYNLVIGEKFIIRRESNSQSINDDIVRKEDYIHLDLVLHHEEWRYAYKYPK 1183
1133 1136

1188 EQEKEKLFSLIISDSNEFYKTIIEIKEYDEQPSYSCQLLFFKKDEESTDDIGLIGIHRFYESSG 1205
1205

1248 VLRKKYKDYFCISKWYLKEVRKPKYKNSLGNWQFIPKDEGWTE 1256
1253 1256

9 matches found in sequence:
q38195 ; ORF22.
(from "bt_spt.pep")
TOIG of: q38195 check: 6808 from: 1 to: 179

ID Q38195 PRELIMINARY; PRT; 179 AA.

```

AC Q38195;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORF22.
OS Clostridium botulinum phase 1C.
OC Viruses.
OX NCBI_TaxID=35348;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the Botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C-468.";
RL Mol. Gen. Genet. 243:631-640(1994).
DR EMBL; X72793; CAA51308.1; -.
DR PIR; S46426; S46426.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22004 MW; 7B51A9D6BA48DBBE CRC64;

Q38195 Length: 179 September 1, 2004 07:07 Type: P Check: 6808 ..
Found using 'seq23' (hayes346.key)

1 MNDLFYAIEKLNKDNQHNFIEMSLKKYIEKTSKKYMLYDYDNDILYHLWKELIEINLK
36 39 43 46 51
39 42
40 43

61 NFNSELDLRKYISTIKRYCINICKKRNDRKKIYNSEVYTKKLDANNVSLYCDNFEFL
101
110

121 DLISILNYKEQIILYMKFFEGRKNDEIAIRLRSQSIYKIRITSLKKLYPIVMQLVNI
135
170

-----
5 matches found in sequence:
q38196 ; ANTP-33 protein.
(from "bt spt.pap")
TOIG of: q38196 check: 8695 from: 1 to: 286

ID Q38196 PRELIMINARY; PRT; 286 AA.
AC Q38196;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ANTP-33 protein.
GN ANTP-33.
OS Clostridium botulinum phase 1C.
OC Viruses.
OX NCBI_TaxID=35348;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the Botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C-468.";
RL Mol. Gen. Genet. 243:631-640(1994).
DR EMBL; X72793; CAA51311.1; -.
DR PIR; S46429; S46429.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; RicinB lectin.
DR Pfam; PF00652; RicinB lectin; 6.
DR PROSITE; PS50231; RICIN_B_LECTIN; 2.
SQ SEQUENCE 286 AA; 33752 MW; 221C2500C8B187EA CRC64;

Q38196 Length: 286 September 1, 2004 07:07 Type: P Check: 8695 ..

```

```

Found using 'seq23' (hayes346.key)

...

42 SGANQKRWLIYDTNKQAYKIKVMDNTSLILTWNAPLSSVSKTDTNGDNOYWYLLQNYIS
92 95
102 RNVIIIRYNNPNLVQYNIDDTLMVSTQTSSNQFFKFSNCIYEALNNRNCKLQTLQNSD
144
162 RFLSKNLNSQIIVLWOWFDSRQKWIIEYNETKSAYTLKQENNRXYLTWIQNSNNYVETY
207
222 QSTDSLQIYNNYINLYNDMSKYLILYNLODTRVLDVNSQIANGTHVIVDSYHGNTNQOW
230
282 IINLI

-----
24 matches found in sequence:
q38197 ; ANTP-139 protein.
(from "bt spt.pap")
TOIG of: q38197 check: 1897 from: 1 to: 1196

ID Q38197 PRELIMINARY; PRT; 1196 AA.
AC Q38197;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ANTP-139 protein.
GN ANTP-139.
OS Clostridium botulinum phase 1C.
OC Viruses.
OX NCBI_TaxID=35348;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the Botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C-468.";
RL Mol. Gen. Genet. 243:631-640(1994).
DR EMBL; X72793; CAA51312.1; -.
DR PIR; S46430; S46430.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontokilysin; 1.
SQ SEQUENCE 1196 AA; 138726 MW; 88D5956301FAA491 CRC64;

Q38197 Length: 1196 September 1, 2004 07:07 Type: P Check: 1897 ..
Found using 'seq23' (hayes346.key)

...

60 DGGIYDSNFLSQDSERENFLQAIILLKXRNNTISGKQLLSLSTAIPFPYGYIGGGYSS
110
120 PNIFTGKTPKSNKKLNSLVSTIIPFPFGYRETYIESQNNKNFYASNVIIFPGGSNIV
180 ENNVIIYKKDAENGMTMAEIVFQPLLTYKYNKFVIDPAMELTCKLIKSLFYLVGIKFS
211

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```
240 DNLVVPYRLRLTELDNKFQSLNIIDLLISGVDLEFINTNPFYFTNSYFFNSIKQKFKYK
    |
300 -| NIKYTEEGNNAIGNDIKRLKQKQFQINQVODIWNLNLYFCQSFNSIIPDRFSNALKHFY
    | 301
360 RKQYTYMDYTDNYNINGFVNGQINTKLPISKNKNTNIIISKPEKVVNLVNNENNISMKSNIIY
    | 363
420 GDGLKGTEDFYSTYKIPYNEEYERFNSDNFPLNNISIEEVDSDIPEIIDINPKYKNSD
    | 431
480 NLVFTQITSMTEBVTTHALSYQLQAQITNNENFTLLSDFSKVVSCKDKSLVYSFLDNL
    | 503
540 MSYLETIKNDGPIDTKKYLYMLKEVFKNYSFNLTQEIDSMCGINEVVVLFQKALNIL
    | 558
    | 559
600 NTSNSFVEEYQDGSALISKDKNLRPNIEIDDISDLLGLSFKOLNNKLYIYSKNIV
    | 651
660 YFKKIYFSLDQWWTYYYSQYFELICMAKQSILAQESLVKQIVQNKFTLDSKASIPDDTL
    | 665
    | 677
    | 680
720 KLIRETTEKTFIDLSNESQISMRVDNFLNKASICVFVEDIYKFKFSYMEKYINNINIKT
    | 761
780 REFIQRCNTNINDNEKSILINSYTFKTIIDFKFLDIQSIKNFFNSQEVQVMEKILSPYOLL
    | 835
840 FASKGFNSNIEDISGKNTLIQYTESIELVYGNGESLYLKSPNETIKF
    |
...
914 DDKTRLIGNKVNKCGWEIYFEDNGLVFEIIDSNGQESVYLSNIINDNWNYYLISIVDRLK
    | 964
974 DOLLIFNDKNVANVSIDQILSIYSTNIIISLVNKNNSIYVEELSVIDNPEITSEEVIRNF
    | 1032
1034 SYLDNSYIRDSSKSLLEYNKYQLNYVFPETPSLYEVNDNNKSYLSLXNTDGINISSVKF
    | 1035
    | 1055
    | 1058
1094 KLINIDESKYVQKWDECIICVLDGTEKYLDISPENNRIQLVSSKDNAKKITVNTDLFRP
    | 1122
1154 DCITFSYNDKYFSLRQDYNWMLCNDNNKVPKGAHLWILES
    | 1164
    | 1174
-----
6 matches found in sequence:
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q45840 ; 35 kDa hemagglutinin component.
(from "bt_spt.pep")
TOIG of: q45840 check: 1531 from: 1 to: 291

ID Q45840 PRELIMINARY; PRT; 291 AA.
AC Q45840;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE 35 kDa hemagglutinin component.
GN HEM35/B.
OS Clostridium botulinum B.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36827;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=lamanna.
EX MEDLINE=97031041; PubMed=8876967;
RA Yang G.H., Rhee S.D., Jung H.H., Yang K.H.;
RT "Organization and nucleotide sequence of genes for hemagglutinin
RL Biochem. Mol. Biol. Int. 39:1141-1146(1996).
DR EMBL: U24431; AAA99055.1;
DR InterPro: IPR008997; RicinB_like.
DR InterPro: IPR000772; Ricin B lectin.
DR Pfam: PF00652; Ricin B lectin; 5.
DR SMART: SM00458; RICIN; 2.
DR PROSITE: PS50231; RICIN B LECTIN; 2.
SQ SEQUENCE 291 AA; 33383 MW; EBCAECB55FPE31E7 CRC64;

Q45840 Length: 291 September 1, 2004 07:07 Type: P Check: 1531 ..
Found using 'seq23' (hayes346.key)

1 MEHYSTIQNSLNDKIVTISCKANTDLFFYQVFGNGVSLFQQTRNYLERWRIYDSNKA
  4 7
61 YKIKSMNIYNTNLVLTWNPATNHSALQDSNADNOYWLKLDKIGNNSFIASKPNVL
  96 99
121 YADTVARNLKLSTLNNSSYKIFIEIDYVISDFKFTCRISPILAGKVQVQVSMTNLAVN
  139
181 LYIMNDLQKWTIINEKAAAYQFNFKILSNGLVTWIFSDGNTVRVSSSAQNDQYWL
  203
241 NPVSNDYRYTITNLRYKTKVLDDLYGGQTADGTTIQVENSNGDQIWIYGL
  247

-----
3 matches found in sequence:
q45841 ; 17 kDa hemagglutinin component.
(from "bt_spt.pep")
TOIG of: q45841 check: 5146 from: 1 to: 146

ID Q45841 PRELIMINARY; PRT; 146 AA.
AC Q45841;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE 17 kDa hemagglutinin component.
GN HEM17/B.
OS Clostridium botulinum B.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36827;
RN [1]
RP SEQUENCE FROM N.A.
```

```

RC STRAIN=lamanna;
RX MEDLINE=97031041; PubMed=8876967;
RA Yang G.H., Rhee S.D., Jung H.H., Yang K.H.;
RT "Organization and nucleotide sequence of genes for hemagglutinin
RL components of Clostridium botulinum type B progenitor toxin.";
RL Biochem. Mol. Biol. Int. 39:1141-1146(1996).
DR EMBL; U24431; AAA99056.1; -.
DR InterPro; IPR008903; Botulinum_HA-17.
DR InterPro; IPR00772; Ricin_B lectin.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SMART; SM00458; RICIN; 1.
SQ SEQUENCE 146 AA; 16908 MW; 81D1DA470123B4D6 CRC64;

Q45841 Length: 146 September 1, 2004 07:07 Type: P Check: 5146
Found using 'seq23' (hayes346.key)

...

17 SIFSGSLYSPVSGSLTFSSNESSANNOKWVYMAENRCFKISNVAEPNKYLSYDNEGFI
67 70
137 SNQMFKLEKI

177 SLDLSLRWCYWFPIKIAVNTYIMLSLNKYNELDYAMDYDNTNENILSQPLLLLPNFDIYN
97 100

137 SNQMFKLEKI

1 match found in sequence:
q45842 ; 70 kDa hemagglutinin component (Fragment).
(from "bt_spt.pep")
TOIG of: q45842 check: 9981 from: 1 to: 42

ID Q45842 PRELIMINARY; PRT; 42 AA.
AC Q45842;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-DEC-2001 (TrEMBLrel. 19, Last annotation update)
DE 70 kDa hemagglutinin component (Fragment).
GN HEN70/B.
OS Clostridium botulinum B.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OC NCBI_TaxID=36827;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=lamanna;
RX MEDLINE=97031041; PubMed=8876967;
RA Yang G.H., Rhee S.D., Jung H.H., Yang K.H.;
RT "Organization and nucleotide sequence of genes for hemagglutinin
RL components of Clostridium botulinum type B progenitor toxin.";
RL Biochem. Mol. Biol. Int. 39:1141-1146(1996).
DR EMBL; U24431; AAA99057.1; -.
DR NON_TER 42
FT SEQUENCE 42 AA; 4814 MW; 74D27F85CC46CF97 CRC64;

Q45842 Length: 42 September 1, 2004 07:07 Type: P Check: 9981
Found using 'seq23' (hayes346.key)

1 MNSIKIYNHIOEKVINYSDTIDLADGNVYVSRGDGWLISR
9 12

10 matches found in sequence:
q45843 ; P-47 protein (Neurotoxin complex M component) (Fragment).
(from "bt_spt.pep")
TOIG of: q45843 check: 5199 from: 1 to: 412

ID Q45843 PRELIMINARY; PRT; 412 AA.

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AC Q45843;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-47 protein (Neurotoxin complex M component) (Fragment).
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OC NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=202F;
RX MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hielm S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RL proteolytic and nonproteolytic Clostridium botulinum and Clostridium
RL barati.";
RL Curr. Microbiol. 37:262-268(1998).
RN [2]
RP SEQUENCE OF 348-412 FROM N.A.
RX MEDLINE=94297488; PubMed=7764998;
RA East A.K., Collins M.D.;
RT "Conserved structure of genes encoding components of botulinum
RL neurotoxin complex M and the sequence of the gene coding for the
RL nontoxic component in nonproteolytic Clostridium botulinum type F.";
RL Curr. Microbiol. 29:69-77(1994).
DR EMBL; Y10770; CAA71743.1; -.
DR EMBL; S73676; AAC60473.1; -.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1
SQ SEQUENCE 412 AA; 47189 MW; 63CBFAFA642FE5FB CRC64;

Q45843 Length: 412 September 1, 2004 07:07 Type: P Check: 5199
Found using 'seq23' (hayes346.key)

1 YGWDIVYGCSNRVNVKHLKEYINKNQIEFLYSNDYDKQEKIMFDTWELINGSSNFLRI
31 34
61 KIPKOGYLKIKKTIYLVNGVTPIIEIKLDFNDSDNIHVQLKFNVSQSDANIKVIVG
68 71
121 DLSGKMDTEIYFKNLLIKAFIKNVEQVYIFASLNVKSNIEWNPKKFKFVYVSPDN
151
181 SEGVLFILSVVTVNRDISKLTNVDGNILSNSEVGLLISEKLFQNLALPKLSSNMGSDI
184
241 SGKNEVSSYSDTTAGIYNSSTLWYGIKVLWYYPKINSFVLNSYEGNKNKIKVYGRVK
275
301 PTGYEIVVADFSINSINKFMVDSKNKRAYFEIDKNAKTDKTIYIRPVDLIPAAIINSVY
304 308
361 WSMESIKKALGFQLANNFTDIINNIVEWNNIKISEVTNVLNVGFCIQGNMN
363

26 matches found in sequence:
q45844 ; Neurotoxin complex M nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: q45844 check: 1014 from: 1 to: 1165

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ID Q45844 PRELIMINARY; PRT; 1165 AA.
AC
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin complex M nontoxic-nonhemagglutinin component.
GN NTHN.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=94297488; PubMed=7764998;
RA East A.K., Collins M.D.;
RT "Conserved structure of genes encoding components of botulinum
RT neurotoxin complex M and the sequence of the gene coding for the
RT nontoxic component in nonproteolytic Clostridium botulinum type F.";
RL Curr. Microbiol. 29:69-77(1994).
DR EMBL; S73676; AAC60474.1; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; I.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00283; SOYBEAN KUNITZ; 1.
SQ SEQUENCE 1165 AA; 136458 MW; 31AE33D8B2DC6C52 CRC64;

Q45844 Length: 1165 September 1, 2004 07:07 Type: P Check: 1014
Found using 'seq23' (hayes346.key)

...

128 SEVLYSANIVIFGPGSNIVKNNIYKKNFAENGMTMAEILFQPLLTVKYNQFYADPAL
178
188 ELIKLAIKAYFLYGIKPNLNLNIPVRLRNEFSNVEYSELNIIIDFLISGIDYKFTNTP
224
248 YWFIDYFIDVPKVEKHKNDYENIKNNSEIGTSIKLYLEQKFTNVDIWEINLSYFS
248
308 KEFQIMPEKHNALKHYYRKYKYNYSKYQDYNGFVNGQIATKLLSEKQYIINKPQ
330
368 LIINLINKSNLSLKMKNYDGLNGTDPNRYNYKIPDNIAYQHPNNTYLDNVNIEI
399
428 NNIPQITADIYPTNCTPFIPIYNITOSREINTVPYSINYLQSQIMSSDDITLSDF
488 WEVCSNDKSLVSYLDNVINYLDSIKNTPTINTDKYLLWLKEIFRNSYFDITATEEIT
500 525 526
548 TECGINKIVMFGKALNLTDSNFKIEFQNSGALINKDNIIIPKIEIDEMPNSMLN
608 LSFEDLNQLYSIKNTYFKKIYFNFDQWWTEYISQYFDLICMAKKSIIAQENLIKK
618 632 644
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668 IIQKISYLIGASNIPDDILAVMLRTTNTLRDISVESQIAMNNLNFLNKAAACVFSQS
633 647
728 IYPFISPMEOCIKHINKSTKEFTQKCTNINETEKLQIMQNSFSLNDFDLDIQNMKNL
729
788 FNSYTELLIKEQTSFYELSLYAFEEQDNNVIGDASGKNTLIVEYKGIELVYGINNSALYL
791
848 NGSNQSIIFTNDYFENGILNFSFYFWLRNLGQDTIKSLIGSKEYNCGWEIYFQEIGHV
872
908 FNMIDSGNEKNIYLSVDSNNSWHYITISVDRLKEQLLI FIDDLNVVNESIKDILNIYSS
932
968 NIISLSDNKSAYIEGLTILNKPTTGEVLRYFNKLNNSYVRDSNDERLEYNKTYQLYD
1023 1026
1028 YVFPDNPICEVKQDNNIYLTINNINNLNMPCKFKLLSINSNKQYVQKQWDEVIISVLYDT
1045
1088 EKVCVCSNENNRVKIIDNKIMQVKFIISNDIFISNCLTHAHNNKYICLSMKDENYWMIC
1090 1132 1142
1148 NNESNIPKAYLWILKEV
1158

-----
2 matches found in sequence:
q45845 ; ADP-ribosyltransferase C3.
(from "bt_spt.pep")
TOIG of: q45845 check: 6064 from: 1 to: 244

ID Q45845 PRELIMINARY; PRT; 244 AA.
AC Q45845;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE ADP-ribosyltransferase C3.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=94041658; PubMed=8225604;
RA Morishi K., Syuco B., Saito M., Oguma K., Fujii N., Abe N., Naiki M.;
RT "Two different types of ADP-ribosyltransferase C3 from Clostridium
RT botulinum type D lysogenized organisms.";
RL Infect. Immun. 61:5309-5314(1993).
DR EMBL; D17555; BAA04492.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0016740; F:transferase activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003540; Binary toxinA.
DR Pfam; PF03496; Binary_toxA_1.
DR Transferase.
KW Transferase.
SQ SEQUENCE 244 AA; 27406 MW; 08A382AA8AD43E8 CRC64;
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seq23spt.res

Thu Sep 2 08:56:12 2004

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Q45845 Length: 244 September 1, 2004 07:07 Type: P Check: 6064 ..
Found using 'seq23' (hayes346.key)

...

13  LSAGVIAPVTTISVQSPQKCYACTVDKGSYADTFTEFTNVEEAKWGNAYKKYGLSKPE
    |---|
    63 66

73  QEAIKFYTRDASKINGPLRANQNGENGLSSDILQKVKLIDQSFS
    |---|
    170

120 MPQNIILFRGDDPAYLGPFDQKILNKDGTINRDVFEQVAKFLKKDRTYGYISTSLMS
    |---|
    170

180 AQFGRPIVTKFKVTNGSKGYIDPISVFPQGLEVLLPRNNSYY
    |---|
    170

...

5 matches found in sequence:
q45846 : Botulinum neurotoxin type B (fragment).
(from "bt_spt.pep")
TOIG of: q45846 check: 4449 from: 1 to: 361

ID Q45846 PRELIMINARY; PRT; 361 AA.
AC Q45846;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type B;
EX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
RT specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70814; CAA50145.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; ConA_like_lec_gl.
KW Neurotoxin.
FT NON_TER 1 361
FT NON_TER 361
SQ SEQUENCE 361 AA; 42175 MW; 533EA98735CD98E1 CRC64;

Q45846 Length: 361 September 1, 2004 07:07 Type: P Check: 4449 ..
Found using 'seq23' (hayes346.key)

...

14  GSSILLEFIPELLIPVGVFLLESYIDNKNKIITIDNALTKEVKEKWMIDWYGLIVAQWLS
    |---|
    64 67

74  TVNTQFYTIKGMKALNYQAQALEEIIKKYNYISSEKNSNINFNINSKLINEGINQ
    |---|
    87 90
    105

134  AMDNINDFINECSVYIMKKWIPLA
    |---|

...

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```

205  FDLSMYTNNEILIKIFKNYNSEILNIIILNRYDRNNDLDSGYGAKVGVYDGVKLNCKN
    |---|
    255

265  QFKLTSSADSKIRVTQNIIFNSMFLDFSVSPWIRIPKYRNDIQYIHNEYTIINCMK
    |---|
    317

325  NNSGWKISIRGNRIIWTLIDINGTKTSVFPEYNIRED
    |---|

-----
7 matches found in sequence:
q45847 : C2 toxin (Component-I).
(from "bt_spt.pep")
TOIG of: q45847 check: 9343 from: 1 to: 431

ID Q45847 PRELIMINARY; PRT; 431 AA.
AC Q45847;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE C2 toxin (Component-I).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC MEDLINE=96184657; PubMed=8645309;
RA Fujii N., Kubota T., Shirakawa S., Kimura K., Ohishi I., Moriishi K.,
RA Isogai E., Isogai H.;
RT "Characterization of component-I gene of botulinum C2 toxin and PCR
RT detection of its gene in clostridial species.";
RL Biochem. Biophys. Res. Commun. 220:353-359(1996).
RN [2]
RP SEQUENCE FROM N.A.
RC MEDLINE=98323874; PubMed=9659689;
RA Kimura K., Kubota T., Ohishi I., Isogai H., Isogai E., Fujii N.;
RT "The gene for component-II of botulinum C2 toxin.";
RL Vet. Microbiol. 62:27-34(1998).
DR EMBL; D63903; BAA09942.1; -.
DR EMBL; D88982; BAA32536.1; -.
DR PIR; JC4692; JC4692.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003540; Binary toxinA.
DR Pfam; PF03496; Binary toxinA; 1.
DR PRINTS; PR01390; BINARYTOXINA.
SQ SEQUENCE 431 AA; 49403 MW; A1754F6A0849B0C0 CRC64;

Q45847 Length: 431 September 1, 2004 07:07 Type: P Check: 9343 ..
Found using 'seq23' (hayes346.key)

...

51  TKIDNFSTDILFSSLTATIMKEDENQNLDFVERIREALLKNTLDREVIGYVNFPEKLG
    |---|
    101

111  INFSTRDVELNRDISDEILDVKVQIINQFYTKFSVSLGLNDNSIDESIPVIVKTRVPT
    |---|
    141

171  TENVGLVNKKTETVLLNQGFSLIPESAIITTKGKDYTLIEGLSQELDFYNGKSEAWG
    |---|
    174
    208

231  EKNYGVSVKLSQEQIQALEGYLHSDYKALNSYLRNRPNNDELANKKIELISSALSVPK
    |---|
    234
    257

291  IPEITLARYRVDCIPFDLPDSDFDKKENGELIADTKLNEFDKWTGKEIENLSFSSTS
    |---|

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298

351 L

...

5 matches found in sequence:q45848 ; Botulinum neurotoxin type B (Fragment).
(from "bt_spt.pep")

TOIG of: q45848 check: 4700 from: 1 to: 361

ID Q45848 PRELIMINARY; PRT; 361 AA.
AC Q45848;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type B;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70819; CAA50150.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; ConA_like_1ec_gl.
KW Neurotoxin.
FT NON TER 1 1
FT NON TER 361 361
SQ SEQUENCE 361 AA; 42131 MW; A2E0FFC81F9533D CRC64;

Q45848 Length: 361 September 1, 2004 07:07 Type: P Check: 4700 ..
Found using 'seq23' (hayes346.key)

...

14 GSSILLEFPELLIPVGVFLLESYIDNKNKIKTIDNALTTRKVEKWIDMYGLIVAQWLS
64 67

74 TVNTQFYTIKGMKALNYQAQALEBIIKVKNIYSEEEKSNININFNDSKINDGNG
87 90 105

134 AMDNINDFINECSVSYLMKKMPLA

...

205 FDLSTYTNNEILKIFKNYSBILANNIILNRYDRNLLIDLSGYGAKVEYDGVKLNQX
255

265 QPKLTSSADSKIRVTQNONIIFNSMFLDPSVFWIRIPKYNDDIQNIHNEYTIINCXK
317

325 NNSGWKISIRGNRIIWTLLIDNGTKSVFFEVNIRED

27 matches found in sequence:

q45849 ; Neurotoxin.

(from "bt_spt.pep")

TOIG of: q45849 check: 1922 from: 1 to: 1280

ID Q45849 PRELIMINARY; PRT; 1280 AA.
AC Q45849;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
OS Clostridium botulinum C.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36828;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=6813;
RX MEDLINE=96156810; PubMed=8593068;
RA Morishi K., Koura M., Fujii N., Fujinaga Y., Inoue K., Syuto B.,
Oguma K.;
RT "Molecular cloning of the gene encoding the mosaic neurotoxin,
composed of parts of botulinum neurotoxin types C1 and D, and PCR
detection of this gene from Clostridium botulinum type C organisms.";
RL Appl. Environ. Microbiol. 62:662-667(1996).
DR EMBL; D49440; BAA08418.1; -.
DR PIR; A43503; A43503.
DR HSSP; P10845; 3BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_1ec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M.Zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXIDYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147815 MW; 74F813B228B8C989 CRC64;

Q45849 Length: 1280 September 1, 2004 07:07 Type: P Check: 1922 ..
Found using 'seq23' (hayes346.key)

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58 LNKPPRTSPKSGYDPNYLSTDSEKDTFLKELIKFLKINSRGEELIYRLAIDIPFP
108

118 GNNNTPINTFDVDFNSVDVKTROGNNWVKTSINPSVIIITGPRENIIIDPETSTFKLTN

178 NTFAAQEGFGALSIISIPRFLMTYSNATNNVGEGRFSKSEFCMDPILILMELNHTMFN
202

238 LYGAIAPNDQRISSVTSNIFYSQYKVKLEYABIIYAFGGPTIDILPKSGRKYFEKALDY
239 258 267 297

298 RSIARLNSITTANPSSFNKYIGEYKQKLIRKYRFVSSGEVAVDRNKNFAELYKELTOI
300 330 351

358 FTEFNAYKIYVQNRKIYLSNVYPTVTANILDDNVYDIQNGFNIPKSNLNVLFMGQNLNR
363 380

418 NPALRKNPENMLYLF

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466 IGDISDKTIDFLSKDINVEFEVIDYPDNVSVDQVILSKNTSEHQDLILYPIIEGESQV
108


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581 ISLKNKENIIMPKEIDEIPNMLNLSFKDLSENLFNFKNSNYSFEKIIYYDFLDQWNT
    631
    632
641 QYISOYFLICMAKESVLAQESLIKKIIQKKLSYLIGNSNISADNLVLMNLTTTNTLRDI
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701 SNESQIANNVDSEFLNSAAICVFEGNIYPKTISFMEQCINNKNTRBFIQKTNITENE
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761 KLQLINRNIFSSLDPDFLNIENLAKLSFSEETALLIKESTSYELVLYAFQRPDDNNAIGDA
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821 SAKNTSIEYSKDIDLVYGINGDALYNGANQISFSNDFENGLTNSFSIYFWLNLGKD
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881 TIKSKLIGSKEDNCWEIYFQDTGLFVNMDNSNGEKNIYLSVSNNSWHYITISIDRLK
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941 EQLLIFIDDLNVNSESKEILNIYSSNLSLSSNNASIEGLTILNKPPTTSQEVLSNYF
1001 KNLNNSVIRDSNEERLEYNKTYQLYNYVFSNPPIYEIKQNNIYLTNTNTNMLNQASKF
    1022
    1025
1061 KLLSINPNKHQVQFDEVIISLDNMEKYIDISDNLQLIDNKNKGAKMIISNIFIS
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1121 CLTSLCGKVICLSMKDNNYNNMLCNNSNIPKKAYLWTLKEV
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8 matches found in sequence:
q45861 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q45861 check: 184 from: 1 to: 367

ID Q45861 PRELIMINARY; PRT; 367 AA.
AC Q45861;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type E;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70818; CAA50149.1; -.
DR PIR; S48106; S48106.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; Cona_like_lec_gl.
KW Neurotoxin.
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FT NON_TER 1
SQ NON_TER 367
SQ SEQUENCE 367 AA; 42902 MW; 346A610C2FF70262 CRC64;

Q45861 Length: 367 September 1, 2004 07:07 Type: P Check: 184
Found using 'seq23' (hayes346.key)

...

17 ILLEPEPELLIPTILVFTIKSFLGSSDNKNKVIKAINNALKERDEKKEVYSFIYSNWM
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77 KINTQFNKRKEQMYQALQONQVNAIKTIIESKYNSYTLBEKNELTNKYDIKQIENELNQV
    90 93
    108
137 SIAMNNYRFTESSISYLMKLINEVKINKLREYDENVKTYLLNVIHQHGSILGESQOEL
    144
197 N
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240 MRYKNDKYVDTSGYDSNININGDVYKPTNKNQFGIYNDKLSVNSQNDYIIYDNKYKN
    290 297
300 FSTSFVWRIPRYNDKIYVNVNEXYTIINCMRDNNSGWKSVLNHNHIIWTLQDNAGINQKLA
    322
360 FNYGNANG
    362
-----
7 matches found in sequence:
q45862 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q45862 check: 9554 from: 1 to: 367

ID Q45862 PRELIMINARY; PRT; 367 AA.
AC Q45862;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type E;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70815; CAA50146.1; -.
DR PIR; S21178; S21178.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; Cona_like_lec_gl.
KW Neurotoxin.
FT NON_TER 1
SQ NON_TER 367
SQ SEQUENCE 367 AA; 42854 MW; 0810595B3A865570 CRC64;

Q45862 Length: 367 September 1, 2004 07:07 Type: P Check: 9554
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Found using 'seq23' (hayes346.key)

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17 ILLEFPELLIPTILVETIKSFLGSSDNKNKVIKAIINNAKLERDEKWEKVSFTVSNWMT
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    67 70

77 KINTQFNKRKEQWYALQNVNAIKTIIESKYNSTYLLERKNELTNKYDIKQIENELNOKV
    |--|
    90 93
    108

137 SIAMNNIDRFLTESSISYLMKLINE
    |--|
    290 297

240 MRYKNDKVDTSGYDSNININGDVYKPTNKNQFIYNDKLVSENVISQNDYIYDKNYKN
    |--|
    290 297

300 PSISFWVRIPNYDNKIVNVNNEYTIINCVRDNNNGKVSLSNHNELIWTLODNAGINQKLA
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    322

360 FNYGNANG
    |--|
    362

7 matches found in sequence:
q45867 ; P-21 protein.
(from "bt_spt.pep")
TOIG of: q45867 check: 4271 from: 1 to: 179

ID Q45867 PRELIMINARY; PRT; 179 AA.
AC Q45867;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein.
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=17B;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
DR EMBL; X79103; CAA55713.1; -.
DR PIR; S58856; S58856.
DR InterPro; IPR009043; RNA_pol_sigma.
DR PROSITE; PS00304; RNA_POL_SIGMA.
SQ SEQUENCE 179 AA; 21799 MW; 6B5A33D1A11E092A CRC64;

Q45867 Length: 179 September 1, 2004 07:07 Type: P Check: 4271
Found using 'seq23' (hayes346.key)

1 MNKFLQIKRLKNDNREFQEIFKNFEXTIDIFTRKNIYNDYNDILYHLWTLKKVDLSN
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    36 39 42 45 50
    53 56

61 FNTQNDLERYISRTLKRYCYLDCNKRKIDKKIINYNSEIVEGKRLIANSYSSVEVEFND
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OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7272;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
RT neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
RT type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; X79104; CAA55718.1; -.
DR EMBL; AF461538; AAM75951.1; -.
DR EMBL; AF461540; AAM75958.1; -.
DR PIR; S58861; H44644.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin_B_lectin.
DR Pfam; PF00652; Ricin_B_lectin; 5.
DR PROSITE; PS50231; RICIN_B_LECTIN; 2.
SQ SEQUENCE 293 AA; 33872 MW; C140FE3B29058090 CRC64;

Q45871 Length: 293 September 1, 2004 07:07 Type: P Check: 2603 ..
Found using 'seq23' (hayes346.key)

1 MEHYSYVSLNDKIVTISKADTNLFYQVAGNVSLFQQTRNVLWRWLIYDSNKAAYK
4 7
137

61 IKSMDIHNTNVLVTWAPTHNISTQDSNADNQYLLKDKIGNNSFIASYNKPNVLVYA
94 97
137

121 DTVARNKLSTLNNSYKFIEDYIISLNNFTCKISPILDNLKVVQVDVTLNVLNVLY
137

181 TWYGRNQKWTIRYNEEKAAYQFPNTILSGVLTFISNGTNRVSVSSNDQNDQAQYWL
201
237

241 NPVSDDTYTITNLRTDTTKALDLYGGQTANGTAIQVFNHYHGDNDQKWN
137

7 matches found in sequence:
Q45874 : (NCTC 7273).
(from "bt_spt.pep").
TOIG of: Q45874 check: 2384 from: 1 to: 178

ID Q45874 PRELIMINARY; PRT; 178 AA.
AC Q45874;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE (NCTC 7273).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7273;
RA East A.K., Stacey J.M., Collins M.D.;
RL Syst. Appl. Microbiol. 17:306-312(1994).
RN [2]

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RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the botulinum neurotoxin
RT complex in a strain of Clostridium botulinum producing type B and F
RT neurotoxins.";
RL Curr. Microbiol. 37:312-318(1998).
DR EMBL; X79102; CAA55709.1; -.
DR EMBL; Y13630; CAA73966.1; -.
DR PIR; S58864; S58864.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 178 AA; 21653 MW; A82093626DEDB666 CRC64;

Q45874 Length: 178 September 1, 2004 07:07 Type: P Check: 2384 ..
Found using 'seq23' (hayes346.key)

1 MNKLFLOIEMLNKNDNEEFQEIFKHFEKTINIFTRKYNINYDNYNDILYHLVWTLKKVDLSN
36 39 42 45 50
39 42
110 113

61 FNTQNDLERYISRLKRYCLDICKRKRKIDKIIYNSIADKKLSLIANSYSSYSEPEFND
110 113

121 LISILPDDQKKIYMKFVEDIKEDIDIAKLNISRSQSVYKKNIMALERLEPILKLLNM
134

6 matches found in sequence:
Q45875 : HA-33 protein.
(from "bt_spt.pep")
TOIG of: Q45875 check: 3005 from: 1 to: 294

ID Q45875 PRELIMINARY; PRT; 294 AA.
AC Q45875;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7273;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
RT neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
DR EMBL; X79102; CAA55710.1; -.
DR PIR; S58865; S58865.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin_B_lectin.
DR Pfam; PF00652; Ricin_B_lectin; 5.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS50231; RICIN_B_LECTIN; 2.
SQ SEQUENCE 294 AA; 33652 MW; 55A628626934C23D CRC64;

Q45875 Length: 294 September 1, 2004 07:07 Type: P Check: 3005 ..
Found using 'seq23' (hayes346.key)

1 MEHYSTIQSLNDKIVTISKADTNLFYQVAGNVSLFQQTRNVLWRWLIYDSNKA
4 7

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61  YKTKSMIYNTNLVLTWNPAPHNISAQDSNADNQWLLKLDIGNNSFIITASYKNPNLVL
    |---|
    96 99

121  YADTVARNLKLSTLNNSYIKFIEDYVISDFKNFTCRISPILAGGKVVQVQSMTNLAVN
    |---|
    139

181  LYIWNNDLNQWTLIYNEEKAAQOFNFKNLSNGVLWTFISDGNTRVSSAQNNDAAQYWL
    |---|
    203
    238

241  INPVDNYDRYTTINLRDXTKVLDDYGGQADGTTIOVFNSNGGDNIWMTSNP
    |---|
    241 248

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17 matches found in sequence:
q45877 ; Ha70 protein.
TOIG of: q45877 check: 348 from: 1 to: 626
PRT; 626 AA.

ID Q45877 PRELIMINARY; PRT; 626 AA.
AC Q45877;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE Ha70 protein.
GN HA70
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterization of the botulinum toxin complex of
  Clostridium botulinum strain NCTC 2916."
RL FEMS Microbiol. Lett. 140:151-158 (1996).
DR EMBL; L42537; AAB42188.1; -
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; P:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
DR SEQUENCE 626 AA; 71251 MW; E499C0170B21D4DA CRC64;
SQ SEQUENCE 626 AA; 71251 MW; E499C0170B21D4DA CRC64;

Q45877 Length: 626 September 1, 2004 07:07 Type: P Check: 348
Found using 'seq23' (hayes346.key)

1  MNSSIKKYIDQIEKVINYSDTIDLADGNVVRGWDGWLRSQNQLGGSVISNGSTGIV
    |---|
    9 12

61  GD

...

68  NAIPYYPTSPNEEYIKNNIQVFTNFTNANQIPIGFBSKTPSNKLNLYWLOYTYIR
    |---|
    118 123
    120 125

128  YEIKVLQHEIIRAVLYVPSLGVVKSIEFNPGEKINQDFYFLTNDCILNEQFLYKIL
    |---|
    128 128
    183

188  ETTKNIPTNNIFNSKVSSTQVLPYSLNGLVINKGDGYIRTDKDLTGT

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260  FTTSNDTKFSQQYTEERLKDAPNVQLFNSTSLFKFVEEAPSDKNICKAYNTYEKVELI
    |---|
    310 316
    313

320  DYQNGSIVNKAEEYLLPSGLCYCEVTNAPSPSEVVVKQVAEDGFQNGPEEEIVVGVDPDS
    |---|
    339

380  ENIQEINTALSDNYTNIPIGVNPNPFIILFTVNTTGIYKINTQNNLPPLKIVAIAGSN
    |---|
    407
    432

440  RNLQAGNLCNNIKAINIYITGVDDPNTKSYDLVLLNKKDKNYIYRVQPTSPNIENQIKFKR
    |---|
    469 481
    481

500  EGDRLNMSSVNIIDNLNSTGAHYVTROSVDVGNVSYEFTVPGFNFNKDTSNIRLYT
    |---|
    536

560  SNNQIGITLFRVIETIDYKILGIRQNLHLNLTNTSIRLLNGAIYILKVETELNNVNI
    |---|
    578

620  LHIDITN

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3 matches found in sequence:
q45878 ; HA17.
TOIG of: q45878 check: 5199 from: 1 to: 146
PRT; 146 AA.

ID Q45878 PRELIMINARY; PRT; 146 AA.
AC Q45878;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA17.
GN HA17 OR HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterization of the botulinum toxin complex of
  Clostridium botulinum strain NCTC 2916."
RL FEMS Microbiol. Lett. 140:151-158 (1996).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=97677110;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the botulinum neurotoxin
  complex in a strain of Clostridium botulinum producing type B and F
  neurotoxins."
RL Curr. Microbiol. 37:312-318 (1998).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
  type A strains."
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; L42537; AAB42188.1; -
DR EMBL; Y13630; CAA73964.1; -
DR

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DR EMBL; AF461538; AAM75950.1; -.
DR EMBL; AF461540; AAM75957.1; -.
DR InterPro; IPR008903; Botulinum HA-17.
DR Pfam; PF05588; botulinum HA-17; 1.
SQ SEQUENCE 146 AA; 17034 MW; 5B0E7C17041F85E1 CRC64;
Q45878 Length: 146 September 1, 2004 07:07 Type: P Check: 5199
Found using 'seq23' (hayes346.key)
...
17 SIFGSLYLPVSKSLTFSNESSANNOKWVYMAENRCFKISNVAEPNKYLSYDNFGFI
    |---|
    67 70
    70 73
77 SLDSLSNRCYWFPIKIAVNTYIMLSLNKVNELDYAWDIYDTNENILSQPLLLLENFDIYN
    |---|
    97 100
137 SNQMFKLEXI
-----
7 matches found in sequence:
Q45879 ; ORFX.
TOIG of: Q45879 check: 2438 from: 1 to: 178
ID Q45879 PRELIMINARY; PRT; 178 AA.
AC Q45879;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DE DE ORFX.
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
Clostridium botulinum strain NCTC 2916.";
RL FEMS Microbiol. Lett. 140:151-158(1996).
RN [2]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
Clostridium botulinum strain NCTC 2916.";
RL FEMS Microbiol. Lett. 140:151-158(1996).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organization and sequence determination of the two botulinum
neurotoxin gene clusters in Clostridium botulinum type A(B) strain NCTC
2916.";
RL Curr. Microbiol. 36:226-231(1998).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; I42537; AAB42190.1; -.
DR EMBL; Y14239; CAA74633.1; -.
DR InterPro; IPR009043; RNA pol sigma.
SQ SEQUENCE 178 AA; 21652 MW; F8275479DCF8606B CRC64;
Q45879 Length: 178 September 1, 2004 07:07 Type: P Check: 2438
Found using 'seq23' (hayes346.key)
...
1 MNKFLQIKMLKDNBERFQEIFKHFEKTIINFTKYNIDYNDILYHLWYTLKKVDLSN
    |---|
    36 39 42 45 50
61 ENTQNDLERYISRTILKRYCLDICKNRKIDKKIYNSEIADKKLSLIANSYSYSSEFFND
    |---|
    110 113
121 LLSILPDDQKKIYMKFVEDIKEIDIAKKNISRSQSVYKKNIMALERLEPILKLLIN
    |---|
    134
-----
28 matches found in sequence:
Q45880 ; NtnhA protein.
(from "bt_spt.pap")
TOIG of: Q45880 check: 4779 from: 1 to: 1193
ID Q45880 PRELIMINARY; PRT; 1193 AA.
AC Q45880;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DE DE NtnhA protein.
GN NtnhA.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
Clostridium botulinum strain NCTC 2916.";
RL FEMS Microbiol. Lett. 140:151-158(1996).
DR EMBL; I42537; AAB42191.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1193 AA; 138201 MW; 16C0A4760B7E9C76 CRC64;
Q45880 Length: 1193 September 1, 2004 07:07 Type: P Check: 4779
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNFLSQDSEKDFLOAIITLLKRINSTNAGEKLLSLISTAIPFPYIGGGYYA
    |---|
    110
120 FNMITFGAPKSNKKNLSLISSTIPFPYAGIRETNLYGSSDNKSFYASNIVIFGPGANIV
    |---|
    147
180 ENNTVFYKKEADAENGMTWTEIWFQPFITYKYDEFYIDPAIELIKLKLSLYFLYGIKPS
    |---|
    211
240 DDLVIVPLRLSELENISYQLNIYDVLVSGGIDPKFINTDPYFIDNLYFVSNKKVFEHHR
    |---|
    257
300 NIYETEIGNNAIGNDKLRKQKFRININDIWEIENLNLYSFKEFSIMMPDRFNALKHFY
    |---|
360 RKQYKIDYPENYSINGFVNGQINAQLSLSDRNDIINKPEEIIINLNGNNVSLMRNIY
```

Thu Sep 2 08:56:12 2004

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363
420  GDGLKSTVDVDFYSNYKIPYNRAYEYHFNNNSDLSLDNVNIGVIDNIPETIIDVNPYKENC
431 438
480  KFSPOKITSTREINTNIPWPNYLAQNTNNEKFSLSDFVEVWSKDKSLVYSLSNV
503 533
540  MFYLDISIKNSPIDTDKKYLLWLRREIPRNYSFDTATQETINTDOGINKVTFWFGKALNIL
558 559
600  NTSDSFVEEFQNL
...
615  ISLINKKENLSPKXIEIDEPNSMLNLSFKDLSNLFNIFSKNNSYFEKIYDFLDQWWT
665 666
675  QYYSQYFDLICMAKRSVLAQESLIKKIQQKLSYVLIGNSISDNLALMNLTTNTLRLDI
677 680
735  SNESQIAMNNVNFNNVAICVFQNIYPKTFSFMEQCINNINKNTREFIQKCTNIENE
762
795  KLQLINQNFSSLDPDFNLNENLKSFLNSETGLLIKEETSPYELVLYAFQBPNGNAIGDA
836
855  SGKNTSIEYKXDIGLVYGINRDALYNGSNQISPSNDFENGLTNSFSIYFWLNLGKD
905
915  TIKSKLIGSKEDNCGWEIFQDTGLVFNMDNSNGEKNIYLSDVNSNSWHYITISVDRLK
965
975  EQLLIFIDDLVANESIKEILNIYSSNTISLVNENNPYVEGLSILNKPTTSQEVLSNYF
1033
1035  KVLNNSYIRDSSEERLEYNKTYOLNYPVSENPYIBIKQNNNIYLTNTNNNLNQVSKP
1036 1056 1078
1095  KLLSINPNKQYVQKLDVIISVLDMNEKIDISEDNRQLQIDNKNNAKMIISNDIFISN
1123
1155  CLIIISYNGKYLCSMDKENHNWMCNNDMSKYLILWSFK
1186
-----
26 matches found in sequence:
q45887 ; Botulinum neurotoxin type F nontoxic-nonhemagglutinin component.
(from "bt.spt.pep")
TOIG of: q45887 check: 702 from: 1 to: 1165
ID Q45887 PRELIMINARY; PRT; 1165 AA.

```

```

AC Q45887;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type F nontoxic-nonhemagglutinin component.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RC STRAIN=type F;
RA East A.K.;
RL Submitted (MAR-1993) to the EMBL/GenBank/DBJ databases.
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=type F;
RA East A.K.; Richardson P.T., Allaway D., Collins M.D., Roberts T.A.,
RA Thompson D.E.;
RT "Sequence of the gene encoding type F neurotoxin of Clostridium
RT botulinum.";
RL FEMS Microbiol. Lett. 96:225-230 (1992).
DR EMBL; X71086; CAA50404.1; -.
DR PIR; I40644; I40644.
DR GO; GO:0004866; F: endopeptidase inhibitor activity; IEA.
DR GO; GO:0008233; F: peptidase activity; IEA.
DR GO; GO:0015070; F: toxin activity; IEA.
DR GO; GO:0009405; P: pathogenesis; IEA.
DR GO; GO:0006508; P: proteolysis and peptidolysis; IEA.
DR GO; GO:0006160; Kunitz_legume.
DR InterPro; IPR008985; ConA_like_lec_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00283; SOYBEAN_KUNITZ; 1.
KW Neurotoxin.
SQ SEQUENCE 1165 AA; 136526 MW; 312AC293EEDFIC65 CRC64;

Q45887 Length: 1165 September 1, 2004 07:07 Type: P Check: 702 ..
Found using 'seq23' (hayes346.key)

...
128 SEYLSANIVIFPGSNIVKNNIYKKNFAENGMTMAELFQPLFTVKNQFYADPAL
178
188 ELIKCLIKAIYFLYGIKPNNDNLNIPYRLNFPNSVEYSELNIDFLISGIDYKFINTP
198 224
248 YWFDNYFDVPKVEKHKNDYEINKNNSEIGTSIKLYLEQKFKTNVDIWEINLSYFS
248
308 KEFQIMPEKHNALKHYYRKEYKINYSKYQYDINGFVNGQIATKLLSEKQYIINKFO
330
368 LIINLINKSNLSLMSKNYVGDGLNGTTDNFNRNYKIPDNIAVQYHPNNTYLDNVNIEEI
399
428 NNIPQITDADIYPTNNCDTFIPIYNIQTSREINTTVPYSINYLOSQIMNSDDITLSSDF
500
488 WEVVCSDKSLVYSYLDNVINYLDSIKNNTPINTDKYILWLKEIFRNYSFDTATEIT
525 526

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548  TEGINKIVSWFGKAFNLTNTDSFKIEFQSGAIALINKKDNIIIPKIEIDEMPNSMLN
608  LSPEDINEQLYSIYSKNIYFKKIYFNFLDQWWTYYSQYFDLICMAKKSILAQENLIKK
668  IIQKISYLIGASNIPDILAVMLTNTLRDISVESQIAMNNLNNFLNAKAMCVFQSN
728  IYKPIFSMEQCIIKHINKSTKEFIQKCTNINETEKLQIMQNSPNSLDFDLQNMKNL
788  ENSYTELLIKEQTSPEYLSLYAFEEQDNVIGDASGKNTIVEYKGIELVYGINNSALYL
848  NGSNQSIIFTNDYFENGLTNSFSIYFWLRNLGQDTIKSLIGSKYNCGWEIFYQEIQHV
908  FNMIDSGNEKNIYLSDVNSNSWHYITISVDRLKEQLLIFIDNVLVNESIKDILNIYS
968  NIISLSDNKASVIEGLTILNKPTTGEVLRYFNFKNLNSYVRDSNDERLEYNKTYQLYD
1028  YVFPDNPICEVKQDNNIYITINNNLNKMKPCFKLLSINSNKQYVQKWDEVIISVLYDT
1088  EKYVCISNENNRVKIIDNKIMQVKFIISNDIFISNCLTAAHNNKYICLSMKDENYNNWIC
1148  NNESNIPKAYLWILKEV
27 matches found in sequence:
q45888 ; Nontoxic-hemagglutinin (NTNH protein).
(from "bt_spt.pep")
TOIG of: q45888 check: 8618 from: 1 to: 1197
ID Q45888 PRELIMINARY; PRT; 1197 AA.
AC Q45888;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-JAN-1998 (TREMBlrel. 05, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE Nontoxic-hemagglutinin (NTNH protein).
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae; Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NON-PROTEOLYTIC EKLUND B17 ATCC 25765;
RA Campbell K., Collins M., East A.K.;
RL Submitted (MAY-1997) to the EMBL/GenBank/DBJ databases.
[2]
RN RP SEQUENCE FROM N.A.
RC STRAIN=NON-PROTEOLYTIC EKLUND B17 ATCC 25765;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RL Submitted (MAY-1997) to the EMBL/GenBank/DBJ databases.
```

```
[3]
RP SEQUENCE OF 1-23 FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
RT silent type B neurotoxin gene sequences.";
RL J. Biol. Chem. 271:10786-10792(1996).
DR EMBL: X78229; CAA55073.1; -
DR EMBL: X87850; CAA61127.1; -
DR GO: GO:0008233; F:peptidase activity; IEA.
DR GO: GO:0015070; F:toxin activity; IEA.
DR GO: GO:0009405; P:pathogenesis; IEA.
DR GO: GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro: IPR008985; ConA like lec.gl.
DR InterPro: IPR000395; Peptidase_M27.
DR Pfam: PF01742; Peptidase_M27; I.
DR PRINTS: PR00760; BONTOXILYSIN.
DR PRODOM: PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1197 AA; 138959 MW; 20E5F4312A959192 CRC64;
Q45888 Length: 1197 September 1, 2004 07:07 Type: P Check: 8618
Found using 'seq23' (hayes346.key)
...
60  DGGIYDSNFIQSDEKDKFLQAITILLKRINSTNAGEKLLSLISTAIPPPYGGYYA
120  PNMITFGSAPKSNKLNLSLSTIPPPYAGYRETNLYLSSSDNKNFYASNIVIRPGSNIV
180  ENNTVYKKEDAENGMTETWQFLLTYKDYDPAIELMKCLIKSLFLYGIKPS
240  DDLVVPYRLRELENIYSQNLVLLVSGGIDPKFINTDPYWFIDNYFSNAKKVFEDHR
300  NIYKTEVGNNAGNDIKLRKQKFRINTNDIWLNLNLYFSKEFSIMMPDRFNALKPHY
360  RKQYKIDYPENYSINGFVNGQINQAQLFLSDRQDIINKPBEIINLLNGNVSIMRSNIY
420  GDGLKSTVDDFYSNYKIPYNRAYEYHFNNSSDLSLDNVTGVIDNIPEIIDVNPYKEND
480  KFPVQKITSTREINTNPWPINYLQAOQNTNNERFSLSSDFVEVSSKDKSLVYGLSNV
540  MFLDLSIKDNSPDTDEKYIWLREIFRNYSFDTATQETINTCNGINKVAVWFGKALNIL
600  NTSDSFVEEFQNL
615  SSLKKKENLSMPIITEIDEPNYMGLPLNDLNEKLFNLYLKNILYFKKVFENFDQHWIT
```

675 EYYSQFDLIMAKQSILAEKLIKQIIQNKLOLSKADISMDKLMNMLNATGKTIFDLS
677 680

735 NESQIAIDNINDFLNKAICFFDTNIPKFIKSPWQICINSVNSVNTTFFIQKCTNITEDEK
761

795 LQIKLNTFMNIDFEFFDIQIKXIDLTSETDLIKEEKESDYNLFLTLQEDNNKNKVIDIS
835

855 GKNTLYKYSISLVYGVNGDALYLKEPNESVSF

914 IITSKLIENKADNCGWEIYFENNGLVFSIVDCNGNEENIYLSVDISKWYVYISIDRLR
964

974 NQLLIFINDKLIANQSTIEQILNIYSSSTISLVNENNPIYVEGLSILNRSTSEVVNNYF
1032

1034 SYLNSYRIDISGRERLYENIYNYFFPENSLEYVTENNIIYLSIKDNTDLNIQAKF
1035 1051 1058 1077

1094 KLINIDNTKQYVQWDEGVCLLGEDEKYVDISENNFIQLVSSRDYAKKIIFNNDIFKP
1122

1154 NCLTFAYNNKYLISFRDNNYNNIYNNNDNIPKAHLWLTKGI
1164 1174

8 matches found in sequence:
q45890 ; P-47 protein (Unidentified ORF).
(from "bt_spt.pep")
TOIG of: q45890 check: 611 from: 1 to: 416

ID Q45890 PRELIMINARY; PRT; 416 AA.
AC Q45890;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-AUG-1999 (TREMBlrel. 11, Last sequence update)
DT 01-AUG-1999 (TREMBlrel. 11, Last annotation update)
DE P-47 protein (Unidentified ORF).
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the botulinum neurotoxin
complex in a strain of Clostridium botulinum producing type B and F
neurotoxins.";
RT Curr. Microbiol. 37:312-318 (1998).
RL [2]
RN SEQUENCE OF 335-416 FROM N.A.
RP STRAIN=667AB;
RC MEDLINE=96210012; PubMed=8631890;
RX Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
silent type B neurotoxin gene sequences.";
RL J. Biol. Chem. 271:10786-10792 (1996).

DR EMBL; Y13631; CAA73970.1; -.
DR EMBL; X87848; CAA61122.1; -.
SQ SEQUENCE 416 AA; 47570 MW; 56BCE238EDBDFAB9 CRC64;
Q45890 Length: 416 September 1, 2004 07:07 Type: P Check: 611 ..
Found using 'seq23' (hayes346.key)
...
21 LEEYITKNKVEFLYSNTAKQELIKMNFQSWELINGGTSNFIKILIKIKGKFKVRNTTID
71 74
81 LSGINPVLKIDFFNDTSNPVVKLKDFGSESSDNKIVIVSDLSGKLDEEQFYFNKL
141 LIDTFIQEKQVSYIFASLNVTSNIAMNPKQKFEVYVPTNNSDGYLFILSVVTVNRDIS
154 187
201 KLSTNVDGNILSNSEVGLLISEKLPQNLALPKLTSMGSDISQKNFEVSSKSDTTAGI
261 YNSSTLNWYGIKVGLIWYFKINSFVLNSYEGNKLNIKVSRVKLTGYEIVYADFSSISI
279 308 312
321 NKFMYSKKNKRAVEIDKNAKTDKKIYRVDLIPALINSVVYVMSIKEALGFQLAN
333 364
381 NFTNIINDVNNNLKISEVTNFIENVGFCIQKAN

27 matches found in sequence:
q45891 ; NTNH protein.
(from "bt_spt.pep")
TOIG of: q45891 check: 6133 from: 1 to: 1161

ID Q45891 PRELIMINARY; PRT; 1161 AA.
AC Q45891;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-NOV-1996 (TREMBlrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE NTNH protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
silent type B neurotoxin gene sequences.";
RL J. Biol. Chem. 271:10786-10792 (1996).
DR EMBL; X87848; CAA61123.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; I.
DR PRINTS; PR00760; BONTOTOXIFIN.
DR ProDom; PD001363; Bontotoxysin; 1.
SQ SEQUENCE 1161 AA; 135354 MW; 04D9FD7980ADCFBB CRC64;
Q45891 Length: 1161 September 1, 2004 07:07 Type: P Check: 6133 ..
Found using 'seq23' (hayes346.key)

1003 KVLNNSVIRDSSEERLEYKNTQYLYNYVFSSENIYEIKQNNNIYLTNTNTNLLNQVSKF
1004 1024 1027 1046

1063 KLLSINPNKQYVQKLDEVIIISVLNDNMKEKIDISDNRLLQIDNKNNAKMIISNDIFISN
1091 1091

1123 CLIIISYNGKVICLSMEKDNHNHWNMCNNDMSKYLILWSFK
1132 1154

4 matches found in sequence:
Q45892 ; BONT/A protein (NEUROTOSIN type A) (Fragment).
(from "bt_spt pep")
TOIG of: Q45892 check: 2657 from: 1 to: 260

ID Q45892 PRELIMINARY; PRT; 260 AA.
AC Q45892;
DT 01-NOV-1996 (Tremblrel. 01, Created)
DT 01-NOV-1996 (Tremblrel. 01, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE BONT/A protein (NEUROTOSIN type A) (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
RT silent type B neurotoxin gene sequences.";
RL J. Biol. Chem. 271:10786-10792 (1996).
RN [2]
RP SEQUENCE OF 1-30 FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organization and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain
RL NCTC 2916.";
RN Curr. Microbiol. 36:226-231 (1998).
RP [3]
RP SEQUENCE OF 1-30 FROM N.A.
RC STRAIN=NCTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR ENBL; X87848; CAA61124.1; -;
DR ENBL; Y14238; CAA74631.1; -;
DR HSP; P10845; 3BTA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn-BS.
DR Pfam; PF01742; Peptidase M27; I.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
FT NON TER 260 260
SQ SEQUENCE 260 AA; 29305 MW; 37D7DE2AC1972DBB CRC64;

Q45892 Length: 260 September 1, 2004 07:07 Type: P Check: 2657
Found using 'seq23' (hayes346.key)

三

| | | | |
|---|--|---|---------------|
| 1 | MOFVNKQFNKDPVNGVDIAYIKIPNVGOMQPVKAFKIHKKIHWIPERTFTNPEBGDLN | 21 24 | |
| 61 | PPPEAKQVPVSYVD | | |
| ... | | | |
| 135 | INVIPQDGSYRSEBLNLVIGPSADIIQPECKSFGEHVLNLTNRNGYGSQYIRFSPDFTF | 185 | |
| 195 | GFESLEVDTNPLLGAGKFAFDPAVTLAHELIIHAGHLGIAINPNRVKVNINAYVEMS | 233 250 | |
| 255 | GLEVSF | | |
| ----- | | | |
| 28 matches found in sequence: | | | |
| q45893 ; NTNH protein. | | | |
| (from "bt_spt.pep") | | | |
| TOIG of: q45893 check: 614 from: 1 to: 1198 | | | |
| ID | Q45893 | PRELIMINARY; | PRT; 1198 AA. |
| AC | Q45893; | | |
| DT | 01-NOV-1996 | (TREMBLrel. 01, Created) | |
| DT | 01-NOV-1996 | (TREMBLrel. 01, Last sequence update) | |
| DT | 01-OCT-2003 | (TREMBLrel. 25, Last annotation update) | |
| DE | NTNH protein. | | |
| GN | NTNH. | | |
| OS | Clostridium botulinum. | | |
| OC | Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae; | | |
| OC | Clostridium. | | |
| OX | NCEI_TaxID=1491; | | |
| RN | [1] | | |
| RP | SEQUENCE FROM N.A. | | |
| RC | STRAIN=667Ab; | | |
| RX | MEDLINE=96210012; PubMed=8631890; | | |
| RA | Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L., | | |
| RA | Sugiyama H.; | | |
| RT | "Genetic characterisation of Clostridium botulinum type A containing | | |
| RT | silent type B neurotoxin gene sequences."; | | |
| RL | J. Biol. Chem. 271:10786-10792(1996). | | |
| DR | EMBL; X87849; CAA61125.1; -. | | |
| DR | GO; GO:0008233; F:peptidase activity; IEA. | | |
| DR | GO; GO:0015070; F:toxin activity; IEA. | | |
| DR | GO; GO:0009405; P:pathogenesis; IEA. | | |
| DR | GO; GO:0006508; P:proteolysis and peptidolysis; IEA. | | |
| DR | InterPro; IPR008985; ConA-like lec.gl. | | |
| DR | InterPro; IPR000395; Peptidase_M27. | | |
| DR | Pfam; PF01742; Peptidase M27; 1. | | |
| DR | PRINTS; PR00760; BONTOXILYSIN. | | |
| DR | ProDom; PD001963; Bontoxilysin; 1. | | |
| SQ | SEQUENCE 1198 AA; 138352 MW; OD8C41BD61E32A7F CRC64; | | |
| Q45893 Length: 1198 September 1, 2004 07:07 Type: P Check: 614 .. | | | |
| Found using 'seq23' (hayes346.key) | | | |
| ... | | | |
| 60 | DGGIYDSNLSQDSEKDFLOAIITLLKRNSTNAGEKLLSLISTAIPFPYGGYYA | 110 | |
| 120 | PNMITGSAKSNKLNLSLSTIPFPYAGYRETNLYSLSDNKSIFYASNIVIFPGGANIV | 147 | |
| 180 | ENNTVFPKXDAENGMGMTWEINFPQPLTVKDYDEFIDPAIELIKLKLSLYLYGKPS | 211 231 | |
| 240 | DDLVIPIRLRSELENIYSQNLIVDLLVSGGIDPKFINTDPTWFIIDNYSNAKKVFEHR | 257 281 | |
| 300 | NIYETIEGNAIGNDIKLRLLKQKPRININDIWELNLYFSKEFSIMPDPRFNALKHFI | | |
| 360 | RKQYKIDYPENYSINGFVNGQINAOQLSDRNDIINKPEEIIINLLNGNVSLSMSNIY | 363 | |
| 420 | GDGLKSTVDDFYSNYKIPYNRAVEYEHFNNSDSSLNVNIGVIDNIPEIIDVNPYKENC | 431 438 | |
| 480 | KFSPVQKITSTREINTNIPWPINYLQANTNNEKFSLSDFVEVSSKKSLYSFSLNV | 503 533 | |
| 540 | MFYDSIKDNSPIDTDKKYILWLREIFRNYSFDITATQETINTDGINKVVTFGKALNIL | 558 559 | |
| 600 | NTSDSFVEEFQNL | | |
| ... | | | |
| 615 | ISLINKENLSMPKIEIDEIPNSMLNLSFKDLSNLNFIKNNNSYFEKIYYDFDQWWT | 665 666 | |
| 675 | QYYSQYFDLICKAKSVLAQESLIKIIQKLSYLIGNSSSDNLALMLTTTTLRLDI | 677 680 | |
| 735 | SNESQIMNNVNNFLNNVAICVFQINIIYPKFIISPMEQCINNINKNTRFIOKCTNITENE | 762 | |
| 795 | KIQLINQINIFSSLODFELNIELKSLFNSFTGLIKEETSPELVLYAFQEPGNNNAIGDA | 836 | |
| 855 | SGKNTSIBYSKDIGLVYGINSDALYINGSNQSIQSFNDFFENGLTNSFSIYFWLRNLGKD | 905 | |
| 915 | TTKSKLIGSKEDNCGWEIYFQDTGLVFNMDISNGNEKNILSDVSNNSWHYITISVDRLK | 965 | |
| 975 | EQLLIFIDDLNVLVANGSIKEILNIYSNTISLVNENNPIYVEGLSIINRSITSEVVNNYF | 1033 | |
| 1035 | TYINNSYIRDISGERLEVNYKNTYELVNYVFPESLSYEVTENNNIYLSIKNTNNLNIOGAKF | 1036 1056 1059 | |
| 1095 | KLINIDANKQYVQKWDGCVVLLGDEEKYVDLSSENRRIQLVSSKDTAKRIIFNNDIFRP | 1123 | |
| 1155 | NCLTFAYNNKYLSSLRDRNRYNNWMIQNNNDNIPKAAHLWALKGI | 1165 1175 | |

| | | |
|------|---|----------------|
| 257 | | |
| 300 | NIYETEIEGNN | |
| ... | | |
| 313 | GNDIKLRLKQKPRININDIWELNINLYFSKEFSIMMPDRFNALAKHYRKQYKIDYPENY | 363 |
| 373 | SINGFVNGOINAGLSLSDRNODIINKPEEIIINLLGNVSLMRSNIYGDGLKSTVDDFYS | 431 |
| 433 | NIKIPYNRAYEYHFNNSSLDNVNIGVIDNIPEIIDVNPYKENCDFSPVQKITSTRE | 434 438 |
| 493 | INTNIPWPINYLQAOQNTNNKXPSLSSDFEVVSSKSLVYFSLSNVMFYLDSTIKONSP | 503 |
| 553 | DTUKKYVLMWLREIFRNYSDFITATQETINTNCGINKVTVFGKALNIIILNTSDSFVERFQNL | 558 559 |
| ... | | |
| 615 | ISLINKENLSPITTESYEIPNDMLGLPLNDLNEKLFNIYSKNTAYFKKIYFNFLDQWWT | 665 666 |
| 675 | QIYSQYFDLICMAKESVLAQETLRIQKKLSYLIIGNSSISSDNLALMMLATTNTLRDI | 677 680 |
| 735 | SNESQIAMNVDSFLNNAACVFPESNTYKPFISFMEQCINNINIKTEPKIQCTNINEDE | 762 |
| 795 | KLQLINQNVNSLDPEFLNIQNMKSLFSSETALLIKEETWPELVLYAPKEPQNNVIGDA | 836 |
| 855 | SGKNTSIBYSKDIGVYGINSDALYNGSNQISFSFNDFPENGLTNSFSIYFWLRLNGKD | 905 |
| 915 | TTIKSLIGSKEDNCGWRIYFQDTGLVFNMIDSNNGEKNIYLSDVSNNSWHYITISVDRLK | 965 |
| 975 | EQLLIFIDDDLVANESIKEIINIYSSNIISLSENNPSYIEGLTILNKPTTSQEVLSVNF | 1033 |
| 1035 | EVLANSYIRDSNEERLEYNKTYQLYNYVFSDDKPICEVKQNNNIYITNTNTNLLNLQASKF | 1056 1059 1078 |
| 1095 | KLLSINPNKQYVKLDEVIIISVLDNMEKIDIDISEDNRLOLDINKNAKMMIISNDIFISN | 1123 |

EQLLIFIDDLVANESIKEINTYSSNIISLSENNPSYIEGLTILNKPTTSQEVLSNF
 1036
 EVLNNSYIRDSNEERLEYNKTYQLYNYVFSFKPICEVKQNNNYLYLTINTNNLNLOQSKF
 1056
 1059
 KLLSINPNKQYVQKLDVEIISVLNDNMEKIDISEDNRLQLIDNKNNAKMMIISNDIFISN
 1123

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1155 CLTLYNGKVICLSMKDENHNMICNDMSKYLXLWSFK
1164
-----
24 matches found in sequence:
q45916 : 138kDa protein associated with BoNT /C1-haemagglutinin complex.
(from "bt_spt pep")
TOIG of: q45916 check: 1897 from: 1 to: 1196

ID Q45916 PRELIMINARY; PRT; 1196 AA.
AC Q45916;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE 138kDa protein associated with BoNT /C1-haemagglutinin complex.
GN CHN-138.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RA Hauser D.F., Eklund M.W., Popoff M.R.;
RL Submitted (MAY-1992) to the EMBL/GenBank/DBJ databases.
DR EMBL; X66433; CAA47059.1; -
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOLILYSIN.
DR ProDom; PD001963; Bontolixysin; 1.
SQ SEQUENCE 1196 AA; 138726 MW; 88D5956301FA4A91 CRC64;

Q45916 Length: 1196 September 1, 2004 07:07 Type: P Check: 1897
Found using 'seq23' (hayes346.key)

...

60 DGGIYDSNFLSQDSERENFLQAIILKRNNTISGKQLLSLSTAIAPPFYGGGYSS
110
120 PNIPTFGTKPSKNKLSLVSTTIPFPFGGVRVNYIESQNKNFYASNVIIFGPGSNIV
180 ENNVYIYKKNDAENGMTMAEIVFQPLLTYYKYNFYIDPAMELTCLKIKSLYFLYGIKPS
211
240 DNLVVPYRLRTELNDKQPSQLNIIDLLISGGVDLEFINTNPYFTNSYFPNSIKMFEYK
298
300 NIYKTEIGNNAIGNDIKRLKQKQFQINVQDIWNLNLYFQSFNSIIPDRFSNALKHFY
301
360 RKQYVTMDYTDNYNGFVNGQINTKLPLSNKNTNIISKPEKVVNLVNENNISLMSKNY
363
420 GDGLKGTTFDYSTYKIPYNEEYVRFNDSNFPPLNNISIEVDISIPELIDINPYKNSD
431
480 NLVFTQITSMTEVTHTALSINYLQAQITNNENFTLSSDFSKVSSKDKSLVYSFLDNL
503
533

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540 MSYLETIKNDGPIDTDKKYLLWLKVEFKYKNYSFDINLTQEIDSMCGINEVVWFGKALNIL
558
559
600 NTSNSFVEEYQDSGAISLISKDNLRPNIEIDDISDLLGLSFKDLNNKLYEHIYSKNIV
651
660 YFKKIYFSLDQWTEYISQYFELICMAKOSILAQBSLVKQIVQNKFDTLSKASIPDITL
665
677
720 KLIRETEKTFIDLSNESQISMRNVDFLNKASICVFVEDIYPKFIYSMEKYINNINIKT
761
780 REFTQRCNTINDNKESILINSYTFKTTIDFKELDIQSIKNFNSQVQVMKEILSPYQLLL
835
840 FASKGPNISIIEDISGKNTLLIQYTESIELYGVNGESLYLKSPNETIKF
...
914 DDKTRLGNKVNCGWEIYFEDNGLVFEIIDSNGQESVYLSININDNWYVISISVDRLK
964
974 DQLLIFINDKNVANVSIDQILSIYSTNIIISLVKNKNSIYVEELSVDLNPITSERVIRNYF
1032
1034 SYLDNSYIROSCKSLLEYNKYNQIYNYVFPETSLYEVNDNNKSLSLKNTDGINISSVKF
1035
1055
1058
1094 KLINDESKVVQKWDCEIICVLGTEKYLIDISPENNRIQLVSSKDNNAKITVNTDLFRP
1122
1154 DCITFSYNDKYFSLRDGDYNWMLCNDNNKVPKGAHLWILES
1164
1174
-----
27 matches found in sequence:
q45967 : Neurotoxin CONSISTING of botulinum neurotoxin D and C1.
(from "bt_spt pep")
TOIG of: q45967 check: 8797 from: 1 to: 1285

ID Q45967 PRELIMINARY; PRT; 1285 AA.
AC Q45967;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin CONSISTING of botulinum neurotoxin D and C1.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RA MEDLINE=96283801; PubMed=8679691;
RA Morishi K., Koura M., Abe N., Fujii N., Fujinaga Y., Inoue K.,
RA Ogumad K.;
RT "Mosaic structures of neurotoxins produced from Clostridium botulinum
types C and D organisms.";
RL Biochim. Biophys. Acta 1307:123-126(1996).

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DR EMBL: D38442; BAA07477.1; -.
DR HSSP: P10845; 3BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:000508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lect_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Peptidase_M27_BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin.
SQ SEQUENCE 1285 AA; 147365 MW; EED98E4EAC6413 CRC64;
Q45967 Length: 1285 September 1, 2004 07:07 Type: P Check: 8797
Found using 'seq23', (hayes346.key)

1 MTWPKDFNYSDPVNDNDILYLRIPQNKLTTPVKAFMITQNIWVPERFSSDTNPISLK
21 24
61 PPRPTSKYSQYDPSYLSSTDEQKDTFLKGIKLFKRINERDICKKLINLYLVGSPFPMGDS
68 71
121 STPEDTFDTRHTNTIAVEKFENGSMKVTNIITPSVLIFGL
21 24
247 KRIRPOVSEGTSGDQGNVQFELYTFGSDVEIIPQIERLQRLREKALGHYKDIARLNN
297
307 INKTIPSSWSSNIDKYKIFSEKYNFDKNTGNFLVNDKFNLSYSDLTVMSEVIYSSQ
322
367 YNVKRTHYFSKHYLPVFNILDDNTYITINGFNLTGKFNISNGQNIERNPALOKLSS
380 393
427 ESVVDLFTKVCLRLTNSRD
...
480 ETNVENYSNFSLDESILDAKVPTNPEAVDPLLPNVNMEPLNVPGVEEVFYDDITKDVY
530
540 LMSYYLEAQKLSNNVENITLTSVEALGYSNKIYTFILPSLAEKYNKGVQAGLFLNWN
543 575
600 EVVEDETTIMKKDTLDKLSVSAIIPYIGPALNIGNSALRGNFQAFATAGVAFLEGF
545
660 PEFTPALGVFTFYISIQREKIITKIENCLEQVRKRWKDSYQVMVSNWLSRITTFQNH
673 701
720 SYQMYSLSYQADAIKAKIDLEYKKYSGSDKENIKSQVENLKNLSLDVKISEAMNNINKFI
721 742
724
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780 RECSVTYLFKXMLPKV
...
877 NTLMDSGYNAEVRVEGNVQINPIFPDFKLGSSGDDRGKIIVTQENIIVYNAMESFSI
927 931
937 SPWIRINKVSNLPQGTIIDSVKNSGWSIGIISNLFVFTLKQENSEQDINFSYDISKN
952
997 AAGYKWFVFTIITNMGMNMIYINGKIDTIKVKELTGINFSTKITTFQNNKIPNTGLIT
1000
1057 SDSDNINMIRDFYIFAKELDDKDINILFNSLOYTNVVKDYWGNDLRYDKKEYTMINVNYM
1070 1090
1117 NRYMSKKGNGIVENTKNNDFNEGKIIKIRIGTNTDTRVRGENVLVYNTTIDNKQYS
1142
1177 LGMKPSRLGTDLVPLGALDQPMDEIRKYGSFIQPCNTFDYYASQLFLSSNATTNRLG
1206
1237 ILSIGSYFKLGDDYWFNHEYLPVIKIEHYASLLESTSTHWFVFPASE
1267
-----
24 matches found in sequence:
q53550 ; Progenitor toxin L nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: q53550 check: 1586 from: 1 to: 1196

ID Q53550 PRELIMINARY; PRT; 1196 AA.
AC Q53550;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Progenitor toxin L nontoxic-nonhemagglutinin component.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96025415; PubMed=8569530;
RA Ohyanaga T., Watanabe T., Fujinaga Y., Inoue K., Sunagawa H., Fujii N.,
RA Inoue K., Oguma K.;
RT "Characterization of nontoxic-nonhemagglutinin component of the two
RT types of progenitor toxin (M and L) produced by Clostridium botulinum
RT type D CB-16.";
RL Microbiol. Immunol. 39:457-465 (1995).
DR EMBL; S80809; AAB36016.2; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:000508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lect_gl.
DR InterPro; IPR00395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1196 AA; 138718 MW; 6D2DBB5F6AF38324 CRC64;
Q53550 Length: 1196 September 1, 2004 07:07 Type: P Check: 1586
Found using 'seq23', (hayes346.key)
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1058

```
...
60  DGGYDSNFLSQDSERENFLQAIILLKRINNITSGKQLLSLSTAIPTFPYGYGGYSS
    110
120  PNIFTGKTPKSNKLNLSVTSTTPPPFGGYRETNYIESQNNKNFYASNIVIFQPGSNIV
    211
180  ENNVIIYKKDAENGMTMAEIVEQPLLTYYKYNKPYIDPAMELTCKLIKSLYFLYGIKPS
    231
240  DNLVVPVRLTDLNKFQSLNIIDLLISGGVDLEFINTNPWFNTSNFYFNSIKWFEKYK
    298
300  NIYKTEIEGNAIGNDIKRLKQKQFQINQVDIWNILNLYFCQSFNSIIPDRFSNALKHFY
    301
360  RKQYTMWYTDNYNNGFVNGQINTKPLSNKNTNIIISKPEKVNVLNVNENISLMKSNII
    363
420  GDGLKGTTEDFYSTYKIPYNEEYEVRFNSDNFPLNNISIEEVDISIPEIIDIINPYKDNSD
    431
480  NLVFTQITSMTEEVTTHTALSINYLQAOITNNENFTLSSDFSKVSSKDKSLVYSFLDNL
    503
540  MSYLETIKNDGPIDTDKKYLLKLVKVFKNYSFDINLTQEIDSMCGINEVLWFGKALNIL
    558
    559
600  NTSNSFVEEYQDSGAIISLSKKDNLREPNIIEIDISDLSLLGSLFKDLNKKLYEYISKNIIV
    651
660  YFKKIYFSLQWMTWYEQYFELLICMAKQSLAQESLVKQIVQNKFTDLSKASIPPTL
    665
    677
    680
720  XLIRRETEKTFIDLSNESQISMNVRDNLNFKASICVFVEDIYKPFISYWEKYVINNIKT
    761
780  REFIQRCNTININDNEKSLINSYFTKIDFKFLDIQSIKNFPNSQVEQVMKEILSPYQLL
    835
840  FASKGPNISIIISGKNTFIQYTESIELVYGVNGESLYLKSNETIKF
...
914  DDKTRLIGNKVNCGWEIYFEDNGLVFEIIDSNGNQESVYLSNIINDNWNYYISISVDRLK
    964
974  DQLLIFINDKNVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVDLNPITSEVIRNYF
    1032
1034 SYLDNSYTRDSKSLLEYKNKNYQLVNYPFETPSLYEVNDNNKNSYLSKTGDNGINISSVKF
    1035
    1055
    1077
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1094 KLINIDESKGVQKWDCEIICVLDTGTEKIDISPENNRIQLVSSKDNNAKITVNTDLFRP
    1122
1154 DCITFSYNDKYFSLSLRDGDYNNMIMCNDNNKNKVPKGAHLWILES
    1164
    1174
-----
7 matches found in sequence:
q57176 ; Hypothetical protein (Botr) .
(from "bt_spt.pep")
TOIG of: q57176 check: 3129 from: 1 to: 178

ID Q57176 PRELIMINARY; PRT; 178 AA.
AC Q57176;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Hypothetical protein (Botr) .
GN P-21 OR BOTR
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7272;
RA East A.K.; Stacey J.M., Collins M.D.;
RL Syst. Appl. Microbiol. 17:306-312(1994).
RN [2]
RP SEQUENCE FROM N.A.
RX MEDLINE=96096783; PubMed=8521962;
RA Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
RT "Molecular characterization of two forms of nontoxic-nonhemagglutinin
RL components of Clostridium botulinum type A progenitor toxins.";
FEBS Lett. 376:41-44(1995).
RN [3]
RP SEQUENCE FROM N.A.
RA Inoue K., Fujinaga Y., Watanabe T., Ohyama T., Takeshi K.,
RA Morishita K., Oguma K.;
RL Submitted (DEC-1995) to the EMBL/GenBank/DBJ databases.
RN [4]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
RL type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; X79104; CAA55717.1; -.
DR EMBL; D67030; BAA11049.1; -.
DR EMBL; AF461538; AAU75952.1; -.
DR EMBL; AF461540; AAU75959.1; -.
DR PIR; S68219; S68219.
DR InterPro; IPR009043; RNA_pol_sigma.
KW Hypothetical protein.
SQ SEQUENCE 178 AA; 21733 MW; 36E00BBD3F08E69 CRC64;

Q57176 Length: 178 September 1, 2004 07:07 Type: P Check: 3129
Found using 'seq23' (hayes346.key)
```

```
1 MNKLFLOIKMLKNDNREFQEIFKHFKEKTINIFTRKYNIDYNDILYHLWYTLKKVDLSN
    36 39 42 45 50
    39 42
61 FNTQNDLERYISRTLKRYCLDICNKRKIDKKIYNSEIVDKKLSLIANSYSSYLEFNFND
    110
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DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin.
SQ SEQUENCE 1278 AA; 147073 MW; A1BE1318431D6918 CRC64;
Q57236 Length: 1278 September 1, 2004 07:07 Type: P Check: 3506
Found using 'seq23' (hayes346.key)

1 MPVVINSFNYPNDVTILYMQIPYEKSKYKAFEMRWIIIPERNITGTDPSDFD
  21 24 33 36 34 37
  |--| |--| |--|
  237 YGARGVYKETIKVQAPLMAEKPIRLEEFLTFGGQDLNIITSAMKEKIYNLLANYEK
  287 294
  |--|
  297 IATKLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGSYTVNENKFNIEYKGLYSFTBIDL
  316 319
  |--|
  357 ANKEPKVCRNTYFIKYGFLKVPNLDDDDIYTVSEGFNIGNLAVNNGQNIKINPKIIDSI
  372
  417 PDKGLVEKI
  ...
  491 ILDYNSETIPQISQNTLNLVQDDSYVPRYDSNGTSEIEHNVDVLNVFFVHAQKYPEG
  541
  551 ETNISLTSSIDTALSERSQVTFSSSEFINTINKPVHAALFISWINQVIRFTTEATQKS
  571
  611 TFDKIADISLVVPVVGALNIGNEVQKENFKEAFELLGAGILLFVPELLIPTILVFTIK
  624
  671 SFIGSENKKKIKAINNLSMERETKWKKEIYSWIVSNWLTRINTQFNKRKEQMYQALQNG
  701 724
  731 VDAIKTVIEYKYNNTSDERNRLESEYNNINIRELNKKVSLAMENIERFITESSIFYLM
  742
  791 KLINE
  ...
  813 LDYTSERHSILGNSVQELNDLVTSTLNNISIPFELSSYTNDKILILYNKLYKKIKDNSIL
  863
  873 DMRYENKFDISGYSNISGVDYIYSTNENQGIYSSKPSSEVNIAQNNDIILYNGEYO
  931
  933 NFESISFWVRIPKYNKVNLANNEYTIIDCIRNNNSGWKISLNNYKIIWTLQDTAGNQKLV
  934 955 974
  993 PNYQMISIDYINKWIPVTITNNPLGNSRIYINGNLIDEKISNLGDIHVSDNILFKIV
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995
1053 GCNDRTRVGRIRYFKVFTDELGTETLYSDEPDPSILKDFWGNLYLLNKRYILLNLLRT
  1059 1064 1097 1104
  |--| |--| |--|
1113 DKSITQNSFLNINQQRGVYQKPNIFSNTRYTGVEVIRKNGSTDISNTDNFVRKNDLA
  1144
  |--| |--|
1173 YINVVDREVEYRLYADISIAKPEKIIKIRTSNNSNLGQIIVMDSIGNNCTMNFQNNNG
  1173 1183 1186
1233 GNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWSFISKEHGMQEN
  1252
-----
3 matches found in sequence:
q7wrp2 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q7wrp2 check: 7931 from: 1 to: 71

ID Q7WRP2 PRELIMINARY; PRT; 71 AA.
AC Q7WRP2;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=109, and LCL155;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327860; AAQ16541.1; -
DR EMBL; AY327861; AAQ16542.1; -
KW Neurotoxin.
FT NON TER 1 1
FT NON TER 71 71
SQ SEQUENCE 71 AA; 8360 MW; BDC3E11757EF6122 CRC64;

Q7WRP2 Length: 71 September 1, 2004 07:07 Type: P Check: 7931
Found using 'seq23' (hayes346.key)

1 YLYDKEYYLINVLKPNFINRRDSTLSINNIRSTILLANRLYSGIKVKIQRVNSSTN
  1 4 8 11 44 47
  |--| |--|
61 DNLVRNDDRVIL
-----
4 matches found in sequence:
q7wrw0 ; Botulinum neurotoxin type B (Fragment).
(from "bt_spt.pep")
TOIG of: q7wrw0 check: 6112 from: 1 to: 78

ID Q7WRW0 PRELIMINARY; PRT; 78 AA.
AC Q7WRW0;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
```



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GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=215, and 216;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327856; AAQ16537.1; -.
DR EMBL; AY327857; AAQ16538.1; -.
KW Neurotoxin.
FT NON_TER 1
FT NON_TER 78 78
SQ SEQUENCE 78 AA; 9370 MW; 7CF465A3A32CBDBC CRC64;

Q7WRW0 Length: 78 September 1, 2004 07:07 Type: P Check: 6112 ..
Found using 'seq23' (hayes346.key)

1 1 PLYNKEYWMFAGNKNYSIKLKXDSVSGEILTRSKYNQNSNYINRNLVYIGKFIIRK
8 11 19 22 43 46 46 49
1 1 PLYNKEYWMFAGNKNYSIKLKXDSVSGEILTRSKYNQNSNYINRNLVYIGKFIIRK
8 11 19 22 43 46 46 49
61 SNSQSINDIVRNDRVF

-----
3 matches found in sequence:
q7ws40 ; Botulinum neurotoxin type A (Fragment).
(from "bt_spt.pep")
TOIG of: q7ws40 check: 6242 from: 1 to: 77

ID Q7WS40 PRELIMINARY; PRT; 77 AA.
AC Q7WS40;
DT 01-OCT-2003 (TREMELrel. 25, Created)
DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
DE 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Botulinum neurotoxin type A (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=42N, 13, and 137;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327850; AAQ16531.1; -.
DR EMBL; AY327851; AAQ16532.1; -.
DR EMBL; AY327853; AAQ16534.1; -.
KW Neurotoxin.
FT NON_TER 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8863 MW; 4253A787F62EBD32 CRC64;

Q7WS40 Length: 77 September 1, 2004 07:07 Type: P Check: 6242 ..
Found using 'seq23' (hayes346.key)

1 1 KGRDISYMLNLFDPNKGVDVNNIGIRGYMLKGPGRGSVVTNINVLNLTVEGTRKFIK
8 11 19 22 30 33
61 KYASGNEIDIVRNDRVF

-----
3 matches found in sequence:
q7ws40 ; Botulinum neurotoxin type A (Fragment).
(from "bt_spt.pep")
TOIG of: q7ws40 check: 6242 from: 1 to: 77

ID Q7WS40 PRELIMINARY; PRT; 77 AA.
AC Q7WS40;
DT 01-OCT-2003 (TREMELrel. 25, Created)
DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
DE 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Botulinum neurotoxin type A (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=42N, 13, and 137;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327850; AAQ16531.1; -.
DR EMBL; AY327851; AAQ16532.1; -.
DR EMBL; AY327853; AAQ16534.1; -.
KW Neurotoxin.
FT NON_TER 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8863 MW; 4253A787F62EBD32 CRC64;

Q7WS40 Length: 77 September 1, 2004 07:07 Type: P Check: 6242 ..
Found using 'seq23' (hayes346.key)

1 1 KGRDISYMLNLFDPNKGVDVNNIGIRGYMLKGPGRGSVVTNINVLNLTVEGTRKFIK
8 11 19 22 30 33
61 KYASGNEIDIVRNDRVF

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-----
3 matches found in sequence:
q7wuh7 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q7wuh7 check: 7993 from: 1 to: 71

ID Q7WUH7 PRELIMINARY; PRT; 71 AA.
AC Q7WUH7;
DT 01-OCT-2003 (TREMELrel. 25, Created)
DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
DE 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=21;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327859; AAQ16540.1; -.
KW Neurotoxin.
FT NON_TER 1
FT NON_TER 71 71
SQ SEQUENCE 71 AA; 8391 MW; A1B3F4F757EP6122 CRC64;

Q7WUH7 Length: 71 September 1, 2004 07:07 Type: P Check: 7993 ..
Found using 'seq23' (hayes346.key)

1 1 YLLYDKYVLLNVLKPNFNRRDSTLSINNIRSTILLANRLYSGLKVKIQRVNNSSTN
1 4 8 11 44 47
61 DNLVRNDHVV

-----
2 matches found in sequence:
q7wuh8 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q7wuh8 check: 9448 from: 1 to: 73

ID Q7WUH8 PRELIMINARY; PRT; 73 AA.
AC Q7WUH8;
DT 01-OCT-2003 (TREMELrel. 25, Created)
DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
DE 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=37;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327858; AAQ16539.1; -.
KW Neurotoxin.
FT NON_TER 1
FT NON_TER 73 73
SQ SEQUENCE 73 AA; 8641 MW; 163F8D5321495851 CRC64;

Q7WUH8 Length: 73 September 1, 2004 07:07 Type: P Check: 9448 ..
Found using 'seq23' (hayes346.key)

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1  YLLYDKELYLLVLPNNFDGRKDSFLRINNIRRTILLANRLYRGKVKIQVRSSPT
  1 4
  44 47
  
```

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61  DNCVRESERSICIS
  
```

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-----
4 matches found in sequence:
q7wu09 ; Botulinum neurotoxin type B (Fragment).
  (from "bt_spt.pep")
TOIG of: q7wu09 check: 6511 from: 1 to: 78
  
```

```

ID Q7WU09 PRELIMINARY; PRT; 78 AA.
AC Q7WU09;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RC STRAIN=CL196;
RP SEQUENCE FROM N.A.
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
  Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
  neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL: AY327855; AAQ16536.1; -.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 78 78
SQ SEQUENCE 78 AA; 9386 MW; 6E6465A3A32CBDBC CRC64;

Q7WU09 Length: 78 September 1, 2004 07:07 Type: P Check: 6511
Found using 'seq23' (hayes346.key)
  
```

```

1  PLMYNKEYYMFNAGNKNYSIKLKKDSSVGEILTRSKYNQNSNYINRYLXIGKFIIRK
  8 11 19 22
  43 46
  45 46
  
```

```

61  SNSQSINDDIVRNDRVY
  
```

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-----
2 matches found in sequence:
q7wu10 ; Botulinum neurotoxin type A (Fragment).
  (from "bt_spt.pep")
TOIG of: q7wu10 check: 6189 from: 1 to: 77
  
```

```

ID Q7WU10 PRELIMINARY; PRT; 77 AA.
AC Q7WU10;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type A (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RC STRAIN=CL138;
RP SEQUENCE FROM N.A.
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
  Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
  neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
  
```

```

RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL: AY327854; AAQ16535.1; -.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8775 MW; 4C24DE812BFBS3D2 CRC64;
  
```

```

Q7WU10 Length: 77 September 1, 2004 07:07 Type: P Check: 6189
Found using 'seq23' (hayes346.key)
  
```

```

1  KGRSCISSYMLNLFDPNKYDVANNIGIRGYMYLKGRGSVVTTIYNLSTLYEGTKFIK
  19 22 30 33
  
```

```

61  KYASGNEDNIVRNDRV
  
```

```

-----
2 matches found in sequence:
q7wu11 ; Botulinum neurotoxin type A (Fragment).
  (from "bt_spt.pep")
TOIG of: q7wu11 check: 6135 from: 1 to: 77
  
```

```

ID Q7WU11 PRELIMINARY; PRT; 77 AA.
AC Q7WU11;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type A (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RC STRAIN=129;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
  Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
  neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL: AY327852; AAQ16533.1; -.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8699 MW; C686DE812515B3DC CRC64;

Q7WU11 Length: 77 September 1, 2004 07:07 Type: P Check: 6135
Found using 'seq23' (hayes346.key)
  
```

```

1  KGRSCISSYMLNLFDPNKYDVANNIGIRGYMYLKGRGSVVTTIYNLSTLYEGTKFIK
  19 22 30 33
  
```

```

61  KYASGNEDNIVRNDRV
  
```

```

-----
8 matches found in sequence:
q840g4 ; Toxin (Fragment).
  (from "bt_spt.pep")
TOIG of: q840g4 check: 4522 from: 1 to: 347
  
```

```

ID Q840G4 PRELIMINARY; PRT; 347 AA.
AC Q840G4;
DT 01-JUN-2003 (TrEMBLrel. 24, Created)
DT 01-JUN-2003 (TrEMBLrel. 24, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Toxin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium
OX NCBI_TaxID=1491;
RN [1]
  
```

```

RP SEQUENCE FROM N.A.
RX MEDLINE=95183076; PubMed=7877632;
RA Ferreira J.L., Hamdy M.K., McCay S.G., Hemphill M., Kirma N.,
RA Baumstark B.R.;
RT "Detection of Clostridium botulinum type F using the polymerase chain
RT reaction.";
RL Mol. Cell. Probes 8:365-373 (1994).
DR EMBL; S76749; AAP1981.1; -.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:toxin ion binding; IEA.
DR GO; GO:0009405; P:proteolysis and peptidolysis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lect_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR003395; Peptidase_M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR PROSITE; PS001963; Bontoxilysin; 1.
DR InterPro; IPR00395; Peptidase_M27.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR PROSITE; PS001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
FT NON_TER 1
FT NON_TER 347
FT NON_TER 347
SQ SEQUENCE 347 AA; 39439 MW; 79AC9C9BF94F4430 CRC64;

Q840G4 Length: 347 September 1, 2004 07:07 Type: P Check: 4522
Found using 'seq23' (hayes346.key)

1 1 KYKAFEIMRNWIIIPERTICTGTFDFPPASLENGSSAYDPNVLTTDAEKDQRY
2 5
3 6
...

206 YGARGVYKETIKVKQAPLMAEKPIRLEEFTLFGQDLNIITSAMKEKIYNNLLANYEK
266 1 IATRLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGTYVNENKFEIYKLYSFTFIDL
266 266 285 288
326 ANKFVKCRNTYFIKYGLKVP
341

-----
27 matches found in sequence:
q841s3; Neurotoxin.
(from 'bt_spt.pep')
TOIG of: q841s3 check: 952 from: 1 to: 1280

ID Q841S3 PRELIMINARY; PRT; 1280 AA.
AC Q841S3;
DT 01-JUN-2003 (TRENBLrel. 24, Created)
DT 01-JUN-2003 (TRENBLrel. 24, Last sequence update)
DT 01-OCT-2003 (TRENBLrel. 25, Last annotation update)
DE Neurotoxin.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN-TW/2003;
RA Lee M.S., Cheng M.C., Chen Y.P., Shiau J.R., Lin S.Y.;
RT "An outbreak of botulism in black-faced spoonbill in Taiwan.";
RL Submitted (MAR-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY251553; AAP06952.1; -.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.

```

```

DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:proteolysis and peptidolysis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lect_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR003395; Peptidase_M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR PROSITE; PS001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin.
SQ SEQUENCE 1280 AA; 147642 MW; 34C1A2E573EE0AE7 CRC64;

Q841S3 Length: 1280 September 1, 2004 07:07 Type: P Check: 952
Found using 'seq23' (hayes346.key)

...

58 LNKPRXTPSPKSGYDPNYLSTDSEKDTFLKEIKLFKRINSREIGEELIYRLATDPPF
108

118 GANNTPINTDFDVFNSVDVKTQGNWVKTGSINPSVITGPRENIIDPETSTFKLTN

178 NTFAAQEGFGALSIISIPRFMLTYSNATNNVGEGRFSKSEFCMDPILILMELNHAMEN
202

238 LYGIAPNDQRISSVTSNIFYSQYKYLEAIEYAFGGFTIDLIPKSARKYFEKALDY
239 258 267 297

298 RSIAKRLNSITTANPSSFNKYIGEYKQKILRYKRFWESSGEVAVDRNKFALYKELTQI
300 330 351

358 FTEFNKAKIYNAQNRKIVLSNVYTPVTANILDDNVVDIQGNFIPKSNLVLFMGQNLNR
363 380

418 NPALRKVNPFENMLYLF

...

466 IGDISDIKTDIFLSKDINEETEVIDYPDNVSDQVILSKNTSEHGQDLILYPIEGESQV
516

526 LFGNQVFYDNRTQNVYLSYIYESQKLSDNVEDFTFTTSIEBALDNSGKVYTFPKL
547 579

586 ADKVTGVQGGFLMWANDVVEDFTNIRKDTLDKISDVSAIPIYIGPALNISVRRG

646 NFEAFAVTGVITLLLEAFQEFIPALGAFVIYSKYQERNEIITIDNCLCQRIKRWKDSY
677 705

706 EMMICTWLSRITTFQFNISYQWYDSLNQADAIDKIDLEKKYKSGSDKENIKSQVENLK
708 725 746

766 NSLDIKISEAMNNINKPIRECSVTYLFKNMLPKV

...

878 NKKNALVDTSGVNAEVRLEGDVQVNTIYTNDFKLSSSGDKIIVNNLNILYSAIYENSSV
928

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938  SFWIKSKOLTNHNEYTIINSIKQSGWKLCTRNQWIEWLQIDNRKYSKSLFDYSES 954  |---| |---| 986
998  SHGTGYNKWFVVTITNMGYMKLYINGELKQSERIEDLNEVKLDKTIIVFGIDENIQ 1018  |---| |---|
1058  MLWIRDFNIFSKELSNEDINIVYEGQILRNVIKDYMGNPLKFDTEYIINDYIDRYIA 1103  |---| |---|
1118  KSNILVLVQVPRDRSKLYTGNPTIKSVSDKNPYSRIILNGDNIIMHMLYNSGKXWIRDT 1170  |---| |---|
1178  TIYAIEGRECSKNCVYALKSQSNLGNVIGIGISIKNIVSQNKYCSQIFSSFMKNTMLLAD
1238  IYKWRPFSFENATPVAVTNYETKLLSTSSFWKFIISDRDPGWVE 1250  |---| |---|
1239  |---| |---| 1250
```

9 matches found in sequence:
q84gj4 ; Neurotoxin type A light chain (Fragment).
(from "bt_spt.pep")
TOIG of: q84gj4 check: 3085 from: 1 to: 448

```
ID Q84GJ4 PRELIMINARY; PRT; 448 AA.
AC Q84GJ4;
DT 01-JUN-2003 (TrEMBLrel. 24, Created)
DT 01-JUN-2003 (TrEMBLrel. 24, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin type A light chain (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kungo;
RA Seong H.Y., Kim J.S., Lee M.H., Choi Y.M., Choi S.-Y.;
RT "Effects of minor arginyl and isoleucyl tRNA on the expression of
RT botulinum toxin light chain in Escherichia coli.";
RL Submitted (OCT-2002) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY166872; AAC21363.1; -.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
FT NON TER 448 448
SQ SEQUENCE 448 AA; 51325 MW; 89C98BD162AC9FDBE CRC64;

Q84GJ4 Length: 448 September 1, 2004 07:07 Type: P Check: 3085
Found using 'seq23' (hayes346.key)
```

```
1  MPFVYNQFNKYKDPVNGVDIAIKIPINAGQMQVKAFKIHNKIWIPIERDTFTNPEEGDINP 21 24  |---|
61  PPEAKQVPVSYDS
...
```

```
134  INVIQPDGYSRSEELNLVIIGPSADI IQECKSGHEVLNLTRNGYGSTQYIRFSPDFTF 184  |---| |---|
194  GFESLEVDTNPLLGAGKATDPAVTLAHLIAGHRLYGIAINPNRVFKVNTNAYTEMS 232  |---| |---|
254  GLEVSFEELRTFGCHDAKFIDSLQENEFRLYYNKFVDIASTLNKAKSIVGTTSALQYMK 286  |---| |---|
314  NVFKEKYLLSEDTSGKFSVDKLFKFKYMKTEIYTEDDNFVKFFKVLNRKTYLNFDAV 366  |---| |---|
374  FKINIVPKVNYTIYDGFNLNTNLAANFNQNTNINNMFTKLKNTGLFEFYKLLCVRG 426  |---| |---|
434  IITSKYSLDEGYNK 387  |---| |---|

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26 matches found in sequence:
q8gr96 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q8gr96 check: 9264 from: 1 to: 1291

ID Q8GR96 PRELIMINARY; PRT; 1291 AA.
AC Q8GR96;
DT 01-MAR-2003 (TrEMBLrel. 23, Created)
DT 01-MAR-2003 (TrEMBLrel. 23, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RA Ihara H., Kohda T., Morimoto F., Tsukamoto K., Karasawa T.,
RA Nakamura S., Mukamoto M., Kozaki S.;
RT "Clostridium botulinum type B neurotoxin associated with infant
RT botulism.";
RL Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB084152; BAC22064.1; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1291 AA; 150574 MW; 0227CAEF4F58504D CRC64;

Q8GR96 Length: 1291 September 1, 2004 07:07 Type: P Check: 9264
Found using 'seq23' (hayes346.key)
```

```
1  MPVTINNFNNDPIDNNNIIMWEPFARGTGRYKAFKITDRIWIIPRYTFGYKPEDFN 33 36  |---|
... 34 37
```

```
61 KSSGIFNRDVCYYDPDLNTNDKKNI
...
149 ERKKGIFANLIIFPGPVLNENETIDIGIQNHFPASREGFGGIMQMFKFCPEYVSFVNNVQE
199
209 NKGASIFNRGGYFSDPALILMHLELIHVLHGLYGIKVDDLLPIVPNEKKFFMQSDTAQABE
269 LYTFGQDPSSIITPSTDKSYLDKVLNFRGIVDRLNKVLVCISDPNININIKNPKFKY
328
--|
329 KVEVSEGKYSIDVESFDKLYKSLMFGFTTETNAENYKIKTRASYFSDSLPPVVKIKNLLD
331
389 NEIYTTIEGFNISDKNMEKEYRCQNKAINKQAYEEISKEHLAVYKIQMCKSVRAPGICID
421
449 VDNEDLFFIADKNSFSDLLSKNERIE
...
520 VYEKQPAIKKIFTDENTIFQYLYSOTFPLDIRISLTSSFDALLFSNKVYFFSMDYIK
570
580 TANKVVEAGLFAGWKQIVDDFVIEANKSSTWDKIADISLIVPYIGIALNVGNETAAGNF
623
640 ENAFEIAGASILLEFIPELLIPVVGAFLESYIDNKNKIKTIDNALTKRDKWIDMYGL
697
700 IVAQWLSTVNTQFYTIKEGMYKALNYQAQALEEIIKKYKNIYSEKEKSNINIDFNDINSK
720
760 LNEGINQAVDNINNFINECSVSLMKMPIA
...
838 FDLSMYTNNTILIEIPKYNSEILNINIILNRYDRDNNLIDLSYGANVEYDGVELNDKN
888
898 QPKLTSSSTNSEIRVTQONQNIIFNSMFLDFSFSFWIRIPKYXNDGIQNYTHNEYTIINCIR
950
958 NNSGWKISIRGNRIIWLTLTDINGKTSVFFEYSIREDISDYINRW
...
1008 TNNSDNAKIYINGKLESNIDIKDIGEVIANGEIIFKLDGIDIRDTQFIWKKYFSIFNTELS
1058
1068 QSNKEIYKIQSYSEYKLPFGWGNPLMYNKYFNAGNKNNSYIKLKKDSSVGEILTRSKY
1080
1128 NONSNVINTRNLYIGEKFTIRKSKNSQSINDDIVRKEDYIYLDFFNSRNEWRYAYKDFK
1133
...
1136
1166
1168
```

```
1188 EBEKKLFLANIYDSNEFYKTIQIKKEYDEQTYSCQLLFXKDEESTDEIGLIGHRFYESG
1205
1248 IVLKDYKNYFCISCKWYLKEVKKRPYNPNLGCNWQFIPKDEGWIE
1253
1256
-----
18 matches found in sequence:
q8khu9 : HA-70.
(from "bt_spt.pep")
TOIG of: q8khu9 Check: 9252 from: 1 to: 626

ID Q8KHU9 PRELIMINARY; PRT; 626 AA.
AC Q8KHU9;
DT 01-OCT-2002 (TREMELrel. 22, Created)
DT 01-OCT-2002 (TREMELrel. 22, Last sequence update)
DT 01-JUN-2003 (TREMELrel. 24, Last annotation update)
DE HA-70.
GN HA70.
OS Clostridium botulinum.
OC Bacteria: Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DDBJ databases.
DR EMBL; AF461538; AAM75949.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
SQ SEQUENCE 626 AA; 71391 MW; 6137CB6D64BDE32C CRC64;

Q8KHU9 Length: 626 September 1, 2004 07:07 Type: P Check: 9252
Found using 'seq23' (hayes346.key)

1 MNSSIKIYNDIQEKVINYSYDITDLADGNVYVRRGDGWTLSRQNLGGSVISNGSGTIV
9 12
61 GD
...
68 NAIPYYPTPSFNEEYIKNNIQTVFTNFTEANQIPIGFBSFKTAPSKNLYMYLQYTYIR
118 123
120 125
128
128
128
188 ETTKNIPTNINFSKVSSTQRLPYNSGLYVINKGDGYIRTNDKDLIGT
...
260 FTTSNDTKFSQQYTEERLKDAPNVQLFNTSTSLFKFVEEAPSDKNICIKAYNTYKYEI
183
```

```

320 DYONGSIVNKAEEYVPSLGEVNTAPSPSEVVMQVAEDGFIQNGPEBEIVVGVIDPS
      339
      |--|
380 ENIQEINTAISDNVTYNI PGIVNNPPYILFTVNTTGIYKINAQNPLSLKIVEAIGSGN
      407
      |--|
440 RNFQSGNLCDDIKAINIYITGFDSPNAKSLVLLNKDKNYIRVPQTSNNIENQIQFKR
      469
      |--|
500 BEGLRLNMSSVNIIDNINASTGAHYITRQSPDVHDIYSIEFTIPGNFNKDTSNIRLYT
      481
      |--|
560 SYNGIGTFRVETIDYGNLNIQQNLHLNNTNSIRLLNGAIYILKVEVTELNYYNIR
      536
      |--|
620 LHIDITN
      578
      |--|
-----
3 matches found in sequence:
q8ku10 : Putative flagellin (Fragment).
TOIG of: q8ku10 check: 339 from: 1 to: 211
-----
ID Q8KU10 PRELIMINARY; PRT; 211 AA.
AC Q8KU10;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DE Putative flagellin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461542; AAM75964.1; -.
DR GO; GO:0003796; F:lysozyme activity; IEA.
DR GO; GO:0016998; P:cell wall catabolism; IEA.
DR GO; GO:0009253; P:peptidoglycan catabolism; IEA.
DR InterPro; IPR002053; Glyco_hydro_25.
DR InterPro; IPR002477; PG_binding.
DR Pfam; PF01183; Glyco_hydro_25; 1.
DR Pfam; PF01471; PG_binding_1; 1.
DR SMART; SM00641; Glyco_25; 1.
DR SMART; SM00641; Glyco_25; 1.
SQ SEQUENCE 211 AA; 24392 MW; 26B3FCFB60C9FF2D CRC64;

-----
3 matches found in sequence:
q8ku10 : Putative flagellin (Fragment).
TOIG of: q8ku10 check: 339 from: 1 to: 211
-----
ID Q8KU10 PRELIMINARY; PRT; 211 AA.
AC Q8KU10;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DE Putative flagellin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461542; AAM75964.1; -.
DR NON TER 1
FT NON TER 1
SQ SEQUENCE 211 AA; 24392 MW; 26B3FCFB60C9FF2D CRC64;

-----
Q8KU10 Length: 211 September 1, 2004 07:07 Type: P Check: 339
Found using 'seq23' (hayes346.key)
-----
111 EITTYEFKEIIANNKSNKKNQIAFELSNNKKTITFAINNKDINLYIFDEEYNSFDISDIL
      161
      |--|
171 NSSNIIEKVLSELNNQNYIGIKTNELEYKLNFEQNNQIL
      187
      |--|
      190
-----
7 matches found in sequence:
q8ku11 : Lyca.
(from "bt_spt.pep")
TOIG of: q8ku11 check: 1017 from: 1 to: 316
-----

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ID Q8KU11 PRELIMINARY; PRT; 316 AA.
AC Q8KU11;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE Lyca.
DE Lyca.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461541; AAM75963.1; -.
DR GO; GO:0003796; F:lysozyme activity; IEA.
DR GO; GO:0016998; P:cell wall catabolism; IEA.
DR GO; GO:0009253; P:peptidoglycan catabolism; IEA.
DR InterPro; IPR002053; Glyco_hydro_25.
DR InterPro; IPR002477; PG_binding.
DR Pfam; PF01183; Glyco_hydro_25; 1.
DR Pfam; PF01471; PG_binding_1; 1.
DR SMART; SM00641; Glyco_25; 1.
DR SMART; SM00641; Glyco_25; 1.
SQ SEQUENCE 316 AA; 35168 MW; 66AC67FE0D06701 CRC64;

-----
Q8KU11 Length: 316 September 1, 2004 07:07 Type: P Check: 1017
Found using 'seq23' (hayes346.key)
-----
26 PAIRAGYGNKNDKQFINNANGCTSVGMFGLYWFYSYATENMARKEAQYCVAAQAKYK
      130
      |--|
86 ISYPICYDLEVDITIRYANNCGVTTIKSLATQWHAFCQEVERNGYFAMNYSNQDFLLNKF
      96 99
      |--|
146 DSNLLKRYALWYAMYNNSLNRTCGIWOYSENGRVPGIAGAVDMNVCYLNMPGASNTSPN
      153
      |--|
      157
      191
      193
206 KNAPRGVHYLIRELQQEINSQGLGEVVVDGIAGQATINSAP
      193
-----
3 matches found in sequence:
q8ku12 : Putative flagellin (Fragment).
(from "bt_spt.pep")
TOIG of: q8ku12 check: 5098 from: 1 to: 261
-----
ID Q8KU12 PRELIMINARY; PRT; 261 AA.
AC Q8KU12;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DT 01-OCT-2002 (TrEMBLrel. 22, Last annotation update)
DE Putative flagellin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461542; AAM75964.1; -.
DR NON TER 1
FT NON TER 1
SQ SEQUENCE 261 AA; 35168 MW; 66AC67FE0D06701 CRC64;

-----
Q8KU12 Length: 261 September 1, 2004 07:07 Type: P Check: 339
Found using 'seq23' (hayes346.key)
-----
111 EITTYEFKEIIANNKSNKKNQIAFELSNNKKTITFAINNKDINLYIFDEEYNSFDISDIL
      161
      |--|
171 NSSNIIEKVLSELNNQNYIGIKTNELEYKLNFEQNNQIL
      187
      |--|
      190
-----
7 matches found in sequence:
q8ku11 : Lyca.
(from "bt_spt.pep")
TOIG of: q8ku11 check: 1017 from: 1 to: 316
-----

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RT type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461540; AAM75955.1; -.
FT NON TER 1
SQ SEQUENCE 261 AA; 29798 MW; 877B6E21D5D7FD72 CRC64;

Q8KU12 Length: 261 September 1, 2004 07:07 Type: P Check: 5098
Found using 'seq23' (hayes346.key)

...

111 EITVDFEKLIANDKSNKNKQIVFELTNKKKALDINSKDVNLYISDBEYNSFDSIDIL
161
171 NSPNIIGKVLSELKNQYVIGIKTNEVLEKLNFEQNQLLEETTLDKIQSIDIAKELVE
187
190
231 KSKNEILVNTNAV

...

2 matches found in sequence:
q8kul3 ; NTNH (Fragment).
(from "bt_spt.pep")
TOIG of: q8kul3 check: 8442 from: 1 to: 197

ID Q8KUL3 PRELIMINARY; PRT; 197 AA.
AC Q8KUL3;
DT 01-OCT-2002 (TReMBLrel. 22, Created)
DT 01-OCT-2002 (TReMBLrel. 22, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE NTNH (Fragment).
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461538; AAM75948.1; -.
DR GO; GO:0009420; C:flagellar filament (sensu Bacteria); IEA.
DR GO; GO:0005198; F:structural molecule activity; IEA.
DR GO; GO:0001539; P:ciliary/flagellar motility; IEA.
DR InterPro; IPR001492; FlagellinN.
DR Pfam; PF00669; Flagellin_N; 1.
DR PRODOM; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 197 AA; 21834 MW; E1BC437D9D7FB483 CRC64;

Q8KU13 Length: 197 September 1, 2004 07:07 Type: P Check: 8442
Found using 'seq23' (hayes346.key)

...

60 DGIYDSNLFUSQSEKDKFLQAIITLLKRINSTNAGEKLLSLSTAIPFYGGYYA
110
120 PNMITGSA PKSNKLSLSSITPFPYAGYRETNLYLSSSDNKSFYASNIVIFPGANIV
147

RT type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461540; AAM75955.1; -.
FT NON TER 1
SQ SEQUENCE 261 AA; 29798 MW; 877B6E21D5D7FD72 CRC64;

Q8KU12 Length: 261 September 1, 2004 07:07 Type: P Check: 5098
Found using 'seq23' (hayes346.key)

...

111 EITVDFEKLIANDKSNKNKQIVFELTNKKKALDINSKDVNLYISDBEYNSFDSIDIL
161
171 NSPNIIGKVLSELKNQYVIGIKTNEVLEKLNFEQNQLLEETTLDKIQSIDIAKELVE
187
190
231 KSKNEILVNTNAV

...

2 matches found in sequence:
q8kul3 ; NTNH (Fragment).
(from "bt_spt.pep")
TOIG of: q8kul3 check: 8442 from: 1 to: 197

ID Q8KUL3 PRELIMINARY; PRT; 197 AA.
AC Q8KUL3;
DT 01-OCT-2002 (TReMBLrel. 22, Created)
DT 01-OCT-2002 (TReMBLrel. 22, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE NTNH (Fragment).
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461538; AAM75953.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXIDLYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
FT NON TER 197
SQ SEQUENCE 197 AA; 21834 MW; E1BC437D9D7FB483 CRC64;

Q8KU13 Length: 197 September 1, 2004 07:07 Type: P Check: 8442
Found using 'seq23' (hayes346.key)

...

60 DGIYDSNLFUSQSEKDKFLQAIITLLKRINSTNAGEKLLSLSTAIPFYGGYYA
110
120 PNMITGSA PKSNKLSLSSITPFPYAGYRETNLYLSSSDNKSFYASNIVIFPGANIV
147

3 matches found in sequence:
q8kul4 ; Putative flagellin.
(from "bt_spt.pep")
TOIG of: q8kul4 check: 1982 from: 1 to: 452

ID Q8KUL4 PRELIMINARY; PRT; 452 AA.
AC Q8KUL4;
DT 01-OCT-2002 (TReMBLrel. 22, Created)
DT 01-OCT-2002 (TReMBLrel. 22, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 24, Last annotation update)
DE Putative flagellin.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461538; AAM75948.1; -.
DR GO; GO:0009420; C:flagellar filament (sensu Bacteria); IEA.
DR GO; GO:0005198; F:structural molecule activity; IEA.
DR GO; GO:0001539; P:ciliary/flagellar motility; IEA.
DR InterPro; IPR001492; FlagellinN.
DR Pfam; PF00669; Flagellin_N; 1.
DR PRODOM; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 452 AA; 51691 MW; 8B99DECA478AB59 CRC64;

Q8KU14 Length: 452 September 1, 2004 07:07 Type: P Check: 1982
Found using 'seq23' (hayes346.key)

...

302 EITVDFEKLIANDKSNKNKQIVFELTNKKKALDINSKDVNLYISDBEYNSFDSIDIL
352
362 NSPNIIGKVLSELKNQYVIGIKTNEVLEKLNFEQNQLLEETTLDKIQSIDIAKELVE
378
381
422 KSKNEILVNTNAV

...

24 matches found in sequence:
q8kzm3 ; Type E botulinum toxin.
(from "bt_spt.pep")
TOIG of: q8kzm3 check: 6924 from: 1 to: 1252

ID Q8KZM3 PRELIMINARY; PRT; 1252 AA.
AC Q8KZM3;
DT 01-OCT-2002 (TReMBLrel. 22, Created)
DT 01-OCT-2002 (TReMBLrel. 22, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE Type E botulinum toxin.
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=BL 5262;

```

RA Tsukamoto K., Mukamoto M., Kohda T., Ihara H., Wang X., Maegawa T.,
RA Nakamura S., Karasawa T., Kozaki S.;
RT "Clostridium butyricum bont/E gene for type E botulinum toxin,
RT complete cds.";
RL Submitted (JUL-2002) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB088207; BAC05434.1; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
SQ SEQUENCE 1252 AA; 143510 MW; 41B633BB744D3B41 CRC64;
Q8KM3 Length: 1252 September 1, 2004 07:07 Type: P Check: 6924 ..
Found using 'seq23' (hayes346.key)

1 MPTINSFYNDPVNRRITLYIKPGGQQFYKSFNIMKNIWIIPERNVIGTIPQDFLPPTS
30 33

61 LKNGDSSYDFNYLQDQEKDF

...

222 YGAKGIITKYITQKQNLITNIRGTNIEFLTGGTLNITSAQSNDIYTNLLADYKK
272 279

282 IASKLSKVQVSNPLNPKYDVFYAKYGLDKDAGSIYVNKFNDFKLYSFTFELAT
282 299

342 KFOVKCRQTYIGQYKFKLSNLLNSIYNSIEGVNINLNKVNFRQGANLNPRIITPTG
355 357

402 RGLVKKIIR

...

472 ILNFSBSAPGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVNLNFFVYLDQKVPGE
522

532 ENNVNLTSSIDTALLEQPKIYTFSSFEFINNVKPVQAALEFGWIQQVLVDFTTEANOKS
552

592 TVDKIADISIVPVIIGLAINIGNEAQNKGFKDALELLGAGILLSEPELLIPTILVFTIK
605

652 SFLGSSDNKNKVIKAINNALKERDEKKEVVSFIVSNWMTKINTQFNKRKEQMYCALQNG
682 705

712 VNALKAITESKYSNTYLEEKNELTNKYDIEQIENELNOKVSIAMNNIDRFLTESSISYIM
723

772 KLINE

...
855 MRYKNDKYVDTSGYDSNININGDVYKPTNKQFGIYNDKLSSEVNIQNDYIIYDNKYKN
905 912
915 FSIQFWVRIPNYDNKIVNVNNEYTIINCMRDNRNSGKWSLHNHEIITWLTQDNGSINGQKLA
937
975 PNYGNANGISIDYINKWIFVTITNDRLGSKLYINGNLIDKKSILNLGNHVSDNLFKIV
977
1035 NCSTRYIGIRYFNIQFKELDETEIQIYLYNNEPNANILKDFWGNLYLYDKKEYILLNVLKP
1038 1046
1041
1095 NNFNRRDSTLSINNIRSTILLANRLYSGIKVKIQRVNNSSTNDNLVRKNDQVYINPVA
1122 1149
1155 SKTHLLPLYADTATNKEKTIKISSGNRFNQVYVVMNSVGNKNTMNFQNNNGNIGLGF
1215 KADTVVASTWYTHMRDNTNSNGFFWNFISEHGQEK
1226

2 matches found in sequence:

q8qzs2 : Similar to ras-related C3 botulinum toxin substrate 3 (Rho family,
(from "bt_spt.pep")
TOIG of: q8qzs2 check: 1953 from: 1 to: 195

ID Q8QZS2 PRELIMINARY; PRT; 195 AA.
AC Q8QZS2;
DT 01-JUN-2002 (TrEMBLrel. 21, Created)
DT 01-JUN-2002 (TrEMBLrel. 21, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Similar to ras-related C3 botulinum toxin substrate 3 (Rho family,
DE small GTP binding protein Rac3) (Fragment).
OS Mus musculus (Mouse).
OC Eukaryota; Metazoa; Chordata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
OX NCBI_TaxID=10090;
RN [1]
RP SEQUENCE FROM N.A.
RA Strausberg R.;
RL Submitted (MAR-2002) to the EMBL/GenBank/DBJ databases.
CC -!- SIMILARITY: BELONGS TO THE SMALL GTPASE SUPERFAMILY. RHO FAMILY.
DR EMBL; BC025842; AAH25842.1; -.
DR GO; GO:0005525; F:GTP binding; IEA.
DR GO; GO:0003931; F:small monomeric GTPase activity; IEA.
DR GO; GO:0007264; F:small GTPase mediated signal transduction; IEA.
DR InterPro; IPR003578; GTPase Rho.
DR InterPro; IPR001806; Ras trnsfrmg.
DR InterPro; IPR005225; Small_GTP.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTRNSFRMNG.
DR SMART; SM00174; RHO; 1.
DR TIGRFAMs; TIGR00231; small gtp; 1.
KW GTP-binding; Lipoprotein; Prenylation.
FT NON_TER 1
SQ SEQUENCE 195 AA; 21327 MW; 39A765892EAB897B CRC64;

Q8QZS2 Length: 195 September 1, 2004 07:07 Type: P Check: 1953 ..
Found using 'seq23' (hayes346.key)

...

|--|

17 HASAHASAHASAHASAGEYIPTVFNDNYSANVMVDGKPVNLGLWDTAGQEDYDRLRPLSY
67 70

77 QTDVFLICFSLVSPASFENVRRAKWPVVRHCHPTPIILVGTKILDRDDKDTIERLRDCK
| -- |
101

137 LAPITYOGLAMAREIGS

•
•
•

27 matches found in sequence:
q933k0 ; Type B cryptic neurotoxin.
(from "bt_spt.pep")
TOIG of: q933k0 check: 9700 from

| | | | |
|----------------|--|------|----------|
| Q933K0 | PRELIMINARY; | PRT; | 1291 AA. |
| Q933K0; | | | |
| DT 01-DEC-2001 | (TrEMBLrel. 19, Created) | | |
| DT 01-DEC-2001 | (TrEMBLrel. 19, Last sequence update) | | |
| DT 01-OCT-2003 | (TrEMBLrel. 25, Last annotation update) | | |
| DE | Type B cryptic neurotoxin. | | |
| OS | Clostridium botulinum. | | |
| OC | Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae; | | |
| OC | Clostridium. | | |
| OX | NCBI_TaxID=1491; | | |
| RN | [1] | | |
| RP | SEQUENCE FROM N.A. | | |
| RC | STRAIN=593, and 588 | | |
| RA | Kiyma N., Ferreira J.L., Baumstarck B.R.; | | |
| RT | "Characterization of six type A strains of Clostridium botulinum | | |
| RT | contain type B toxin gene sequences."; | | |
| RL | Submitted (AUG-2000) to the EMBL/GenBank/DBJ databases. | | |
| DR | EMBL; AF300466; AALU1499.1; - | | |
| DR | EMBL; AF300465; AALU1498.1; - | | |
| DR | GO; GO:0004986; F:endopeptidase inhibitor activity; IEA. | | |
| DR | GO; GO:0008237; F:metallopeptidase activity; IEA. | | |
| DR | GO; GO:0015070; F:coxin activity; IEA. | | |
| DR | GO; GO:0008270; F:zinc ion binding; IEA. | | |
| DR | GO; GO:0006508; P:pathogenesis; IEA. | | |
| DR | GO; GO:0006508; P:proteolysis and peptidolysis; IEA. | | |
| DR | InterPro; IPR008985; ConA_like_lec_gl. | | |
| DR | InterPro; IPR002160; Kunitz_legume. | | |
| DR | InterPro; IPR000395; Peptidase_M27. | | |
| DR | InterPro; IPR006025; Pept M_Zn_BS. | | |
| DR | Pfam; PF011742; Peptidase_M27; 1. | | |
| DR | PRINTS; PR00760; BONTOXILYSIN. | | |
| DR | ProDom; PD001963; Bontoxilysin; 1. | | |
| DR | PROSITE; PS00142; ZINC_PROTEASE; 1. | | |
| DR | Neurotoxin. | | |
| SW | SEQUENCE 1291 AA; 150843 MW; 7AC1737B0FA5A151 CRC64; | | |

ID Q93G71 PRELIMINARY; PRT; 1291 AA.
AC Q93G71;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DE 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin type B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1436;
RA Kirma N., Ferreira J.L., Baumstark B.R.;
RT "Characterization of six type A strains of Clostridium botulinum that
contain type B toxin gene sequences.";
RL Submitted (AUG-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF295926; AAK97132.1; -.
DR GO; GO:0004866; F: endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F: metalloproteinase activity; IEA.
DR GO; GO:0015070; F: toxin activity; IEA.
DR GO; GO:0008270; F: zinc ion binding; IEA.
DR GO; GO:0009405; P: pathogenesis; IEA.
DR GO; GO:0006308; P: proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept_M27_B8.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
SQ SEQUENCE 1291 AA; 150824 MW; D7CA07BAE2EB8CD2 CRC64;
Q93G71 Length: 1291 September 1, 2004 07:07 Type: P Check: 8413 ..
Found using 'seq23' (hayes346.key)

1 MSVTINNFNDPIDNDNIIMPEPPFARGTGRVYKAFKITDRIWIIIPERYTFGYKPEDFN
33 36
34 37

61 KSSGIFNRDVCEYYDPDYLNTNDKKN I
... I
149 ERKGIFANLIIFGPGVLENETIDIGIQNHASREGFGGIMQMKTCPYVSFNNVQE
199 I
209 NKGASIFNRGYSFDPALILMHLELHVLHGLYGIKVNLDPIVPNEKKFFMQSTDAIQAE
I
269 LYTFGGQDSIIISPTDKSYDKVLQNPGRGIVDRNLKVLVCISDPNININIKNFKDKY
289 I
329 KFYEDSGKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKLLD
331 I
389 NEIYTBEGFNISDKNMEKEYGQNKAINQAYEISKEHLAVYKIQMCKSVKAPGICID
421 I
449 VDNEDLFFIADKNSFSDLLSKNERIA
... I
520 EYKQPAIKIFTIDENTIFQVLYSQTFPLDIRDISLTSSPFDALLFSNKKVYSFFSMDYIK
570 I

580 TANKVVEAGLFAGWVKQIVDDFVIEANKSSTMDKIADISLIVPYIGIALNVGNETAKGNF
623 I
640 ENAFETAGASILLEFPELLIPVVGAFLLSEYIDNKNKIETINSALTAKDEKWMYGL
697 I
700 IVAQWLSTVNTQFYTIKEGMYKALNYQAALAEELIKYKYNISEKERSNINIDENDVNSK
720 I
760 LNEGINQAIDNINNFINNECSVYLMKMIPLA
... I
838 FDLSTYNTNNTILIEIFNKYNSDIILNIIILNRYRDNKLIIDLSGYGAKVYDGVKLNKDN
888 I
898 QPKLTSSANSKIRVIQNIQNIIFNSMFLDPSVFWIRIPKYKNDGIONVHNEYTIINCMK
950 I
958 NNSGWKISIRGNMIITFLIDINGKIKSVFFEYSIKEDISEYINRWF
... I
1008 TNSDNAKIYNGKLESHIDIRDIRVIANDIEIFKLDGNDIRDTQFTWMKYFSFNTELS
1058 I
1068 QSNTEEYKIQSYSEYLKDFWGNPLMYNKYMFNAGNKNSYIKLKDDSPVGEILTTRSKY
1080 I
1098 I
1128 NQNSKIYNRDLYIGEKFIIRKNSQSINDDIVRKEDYIYLDFFNLNQEWVRVYIKYFK
1133 I
1166 I
1183 I
1188 KEKEKFLAPISDSDEFYNTIQIKEYDEQPTYSCQLLFKKDEESTDEIGLIGHRYESG
1205 I
1248 IVFKYKDYFCISKWYLKEVKRPYNKSLGCGNQFIPKDEGWTE
1253 I
1256 I

30 matches found in sequence:
q93ht3 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q93ht3 check: 3077 from: 1 to: 1291

ID Q93HT3 PRELIMINARY; PRT; 1291 AA.
AC Q93HT3;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
DE NT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
OX [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;


```
60  DGGYDSNPLSQSERENFLQAIILLIKRINNTISGKQLLSLSTAIPFPYGYLGGYSS
    |--|
120  PNITFGKTPKSNKLNLSVTSTIPFPFGGYRETYIESQNKNFYASNIVIFPGSGNIV
    |--|
180  ENNVVYKKDAENGMTAEIVFQPLITTKYKFFYDPAMELTCKLIKSLYFLYGIKPS
    |--|
240  DNLVVPYRLTELDNKQFSQLNIIDLLISGVDLEFINTPYFTNSYFFNSIKMFEKYK
    |--|
298  298
    |
300  NIYKTEEGNAIGNDIKLRKQKQFQINQVQIMWNLNLNFCQSPNSIIPRFSNALKHFY
    |
360  RKQYTTWDTYDNYNINGFVNGQINTKPLSNKNTNIISKPEKVVNLVNNENISLMKSNY
    |
420  GDGLKGTTEDFYSTYKIPYNEEYREYFENDSDNPLNNSIEEVDISIPEIIDINPYKONS
    |
480  NLVPTQITSMTEVTTHTALSGINLQAOITNNENFTLSSDPKVVSSKDKSLVYSFLDNL
    |
540  MSLYLETIKNDGPIDTKKYLWLVKVPKNSYFSDINLTQETDSMCGINEVLWFGKALNIL
    |
600  NTSNSFVEEYQDSGAISLISKKNLREPNIIDISDLSGLSPKDLNKKLYEYLSKNIV
    |
660  YFKKIYFSFLDQWTEYYSQVPELICMAKQSIQAESLVKQIVQNKFTDLSKASIPDPTL
    |
720  KLIRETTEKTFIDLSNESQISMNRVDFNLKASICVFVEDIYKPFISYMEKYINNINIKT
    |
780  REFIQRCNTINDNEKSLINSYTFKTIIDFKFLDIQSKNFFNSQVEQVMKEILSPYQLLL
    |
840  FASKGPNIIEDISGKNTLIQYTESIELVYGVNGESLYLKSPNETIKF
    |
900  ...
914  DDKTRLIGNKVNCGWEIYFEDNGLVPEIIDSNGNQESVYLSNTINDNWYIYSISVDRLK
    |
974  DQLLIFINDKNVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVDLPITSEVIRNYP
    |
1034  SYLONSYIRDSSKSLLEYKNKYQLYNYVFPETSLYEVDNKNNSYLSLKNKTDGINISSVKF
    |
1098  1098
    |
1035  1035
    |
1055  1055
    |
1077  1077
    |
1098  1098
    |
1032  1032
```

```
1094  KLINIDSKVVQKWDCCIICVLDTGTEKYLDISPENNRIQLVSSKONAKKITVNTDLFRP
    |--|
1122  1122
    |
1154  DCITFSYNDKYFSLSLRDGDYNNWMCNDNNKVPKGAHLWILES
    |--|
1174  1174
    |
-----
4 matches found in sequence:
q93ht5 ; HA-33.
(from "bt_spt.pep")
TOIG of: q93ht5 check: 5748 from: 1 to: 285

ID Q93HT5 PRELIMINARY; PRT; 285 AA.
AC Q93HT5;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-33.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N. A.
RC STRAIN=C-Voichi;
RX MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-Terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem. Biophys. Res. Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71747.1;
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 6.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS00231; RICIN B LECTIN; 2.
SQ SEQUENCE 285 AA; 33040 MW; AE7DC4DD05B5F298 CRC64;

Q93HT5 Length: 285 September 1, 2004 07:07 Type: P Check: 5748 ..
Found using 'seq23' (hayes346.key)

...

42  SGANQKRLIYDITNKQAYKIKVMDNTSLILTWNAPLSVSVKTDNGDNQWYLLQNYIS
    |--|
    92 95
    |
102  RNVLIIRNMPNLVLOYNIDDTLWVSTQTSSNQOFFKFSNCIYESFNNSTCKIQTSLTIK
    |--|
    144
    |
162  FIDKQNSNNVTIWSWNGDNQKWKILYNESKWAYTLTICKNNYLTWFFSSIGNNVGTYR
    |--|
    206
    |
222  TEGNNDQYWFNFYLNLDASMYTISNFSNQSKFLDVNSGLADGTNVQVWDSNGTSAQKWI
    |--|
    229
    |
282  I
    |
...

-----
4 matches found in sequence:
q93ht6 ; HA-17.
(from "bt_spt.pep")
TOIG of: q93ht6 check: 9078 from: 1 to: 146
```

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ID Q93HT6 PRELIMINARY; PRT; 146 AA.
AC Q93HT6;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-17.
GN HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-Terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem Biophys Res Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71746.1; -.
DR InterPro; IPR008903; Botulinum HA-17.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF05588; botulinum HA-17; 1.
DR SMART; SM00458; RICIN; 1.
SQ SEQUENCE 146 AA; 16661 MW; 2145CE8A22023764 CRC64;

Q93HT6 Length: 146 September 1, 2004 07:07 Type: P Check: 9078
Found using 'seq23' (hayes346.key)

1 1 MSSERTFLNGYKIKSLFNSLSLYSSGSLFSNTSSLDNOKWKLEYISSNGPRFSN
24 27
1 1 VAEPNKYLAYNDYGFYLSLSSSSNLSLWNPDKTAINSIICTLSIVNVDYAWTIYDNNNN
67 70 73 76
70 73
121 ITDQPI

9 matches found in sequence:
q93ht7 ; ORF-22.
(from "bt_spt.pep")
TOIG of: q93ht7 check: 6460 from: 1 to: 179

ID Q93HT7 PRELIMINARY; PRT; 179 AA.
AC Q93HT7;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORF-22.
GN ORF-22.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-Terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem Biophys Res Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71744.1; -.
DR InterPro; IPR009043; RNA pol sigma.
SQ SEQUENCE 179 AA; 22009 MW; 906635B5786C8406 CRC64;

```

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Q93HT7 Length: 179 September 1, 2004 07:07 Type: P Check: 6460
Found using 'seq23' (hayes346.key)

1 1 MNDLFVAIENLKHNDNQNFNIEMSLKKYIEKTSKKYNDLYDYLHLWKELIINLK
36 39 43 46 51
39 42
40 43

61 NFENSEDLRKYSTIKRYCINICKNRDKKIYNSEVTKYKIDAVNYSLCDNFEL
101 110

121 DLISILNYKEKQIIYMKFFEGRKDNFIAIRLSRSQSIYKIRIKSLKLYPIVQMLVNI
135 170

24 matches found in sequence:
q9far6 ; Type E botulinum toxin.
(from "bt_spt.pep")
TOIG of: q9far6 check: 8127 from: 1 to: 1255

ID Q9FAR6 PRELIMINARY; PRT; 1255 AA.
AC Q9FAR6;
DT 01-WAR-2001 (TrEMBLrel. 16, Created)
DT 01-WAR-2001 (TrEMBLrel. 16, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Type E botulinum toxin.
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=BL 6340/ATCC 43755/BL 5520/KZ 147;
RX MEDLINE=20509829; PubMed=11055954;
RA Wang X., Maegawa T., Karasawa T., Kozaki S., Tsukamoto K., Gyobu Y.,
RA Yamakawa K., Oguma K., Sakaguchi Y., Nakamura S.;
RT "Genetic Analysis of Type E Botulinum Toxin-Producing Clostridium
RT butyricum Strains.";
RL Appl. Environ. Microbiol. 66:4992-4997(2000).
DR EMBL; AB039264; BAB12249.1; -.
DR HSSP; PI0845; 3BTA.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
SQ SEQUENCE 1255 AA; 143918 MW; 1B557B9D85CD8E4D CRC64;

Q9FAR6 Length: 1255 September 1, 2004 07:07 Type: P Check: 8127
Found using 'seq23' (hayes346.key)

1 1 MLYMPTINSFNYNDPVNRTILYIKPGCQQFYKSFNIMKNIWIIPERNVIGTIPQDFLP
33 36

61 PTLKNGDSSYDFNYLQSDQEKDF

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...
225 YGAKGTTTKYITQKQNPILITNIRGTNIEBELTFFGGTDLNIIITSAQSNDRYTNLLADYKK
      275 282
285 IASKLSKVQVSNPLNPNFYKDVFEAKYGLDKDASGIYSVINKNFNDFPKLYSFTFEDLAT
      285
345 KFQVKCRQTYIGQYKFKLSNLLNDSIYNISEGYNINNLKVNFRGQANLNPRITPTG
      345 358 360
405 RGLVKLIIR
...
475 ILNFSESAFGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVNLNFFVYLDQKVPEG
      525
535 ENNVLTSSIDTALLEQPKIYTFPFSSEFINNVNKPQAAALFVGWIIQQVLVDFTTTEANQKS
      555
595 TVDKIADISIVVPYIGLALNIGNEAOKGNFKDALELLGAGILLEFEPPELLIPTILVFTIK
      608
655 SFLGSSDNKNKVIKAINNALKERDEKWEYFVFSFINVMTKINTQFNKRKEQMYCALNQ
      685 708
715 VNALKAIIESKYNSTLEEKNELTKYDIEQIENELNOKVSIAMNNIDRFLTESSISYLM
      726
775 KLINE
...
858 MRYKNDKYVDTSGYDSNININGDYKYPTNKNQFGIYNDKLSVNIQNXYIYDNKYKN
      908 915
918 FSIQFWVRIPNYDNKIYVNVNNEYTIINCMDRDNNGWKVSLNHNIEIWTLDQNSGINQKLA
      940
978 FNYGNANGISDYINKKIVFTITNDRLGDSKLYINGNLIDKKSILNLGNHIVSDNLFKIV
      980
1038 NCSYTRYIGIRYFNIPFKELDETEIQTLYNNEPANILKDFWGNLYLYDKYLYLLNVLKP
      1041 1049 1082 1089
1098 NNFNRRDTSLSINNIRSTILLANRLYSGIKVKIQRVNSSTNDNLVRKNDQVYNFVA
      1125 1152
1158 SKTHLLPLYADATATNKEKTIKISSGNRRFNQVVVMSVGNCTMNFKNNGNNGIIGLF
1218 KADTVVASTWYTYTHMRDNTNSNGFPWFNFISEHGQWEK
      1229
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```

```
3 matches found in sequence:
q9k345 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9k345 check: 4019 from: 1 to: 173

ID Q9K345 PRELIMINARY; PRT; 173 AA.
AC Q9K345; Q9KW91;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-MAR-2001 (TREMBlrel. 16, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Iwanai, and Tenno2;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum
Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216(2001).
DR EMBL; AB040123; BAB07885.2; -.
DR HSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON TER 1
FT NON TER 173
SQ SEQUENCE 173 AA; 13061 MW; 5A89702DE3ACED16 CRC64;

Q9K345 Length: 173 September 1, 2004 07:07 Type: P Check: 4019
Found using 'seq23' (hayes346.key)

...
13 ILNFSESAFGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVNLNFFVYLDQKVPEG
      53 66
73 ENNVLTSSIDTALLEQPKIYTFPFSSEFINNVNKPQAAALFVGWIIQQVLVDFTTTEANQKS
      93 96
133 TVDKIADISIVVPYIGLALNIGNEAOKGNFKDALELLGAGI
      146

-----
25 matches found in sequence:
q9k395 ; Type E botulinum toxin.
(from "bt_spt.pep")
TOIG of: q9k395 check: 2549 from: 1 to: 1251

ID Q9K395 PRELIMINARY; PRT; 1251 AA.
AC Q9K395;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE Type E botulinum toxin.
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=LCL 095;
RA Wang X., Maegawa T., Kozaki S., Tsukamoto K., Kato H., Nakamura S.,
RA Karasawa T.;
RT "C. butyricum (LCL 095) gene for type E botulinum toxin.";
```



```
772 KLINE 723
...
855 MRYKNDKYVDTSGYDSNININGEIFIYPTNKNQFTIFNSKPSVNIQNNDYIIYDNKYKN 905 912
|---| |---| |---|
915 PSTSFWRIRPNYDNKVINNINNEYTIINCMDRNSGKVSLSLNHNEIITWLDQNRINOKLV 937
|---| |---| |---|
975 PKYGNANGISDYINKWIFVTITNDRLGSKLYINGHLIDQKSLNGLNIHVSDNILPKIV 977
|---| |---| |---|
1035 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNPNTNLKDFWGNLYLYDKGYILNVLKP 1038 1046 |---| |---|
1041 1079 1086
1095 NNFDRRKDSTLSINNIRSTILLANRLYSGLKVKIQRVNDSSSTNDRFVRKNDQVYINYS 1122 |---| |---|
1122 1149
1155 NSSSYIYADNTTDDKEKTIKSSSGNRFNQVVMNSVGNCTNFKNNNGNIGLLGFK 1159
|---| |---|
1215 ADTVVASTWYTYTHMRDHTNSNGCFWNPISEHGQXK 1225
|---| |---|
-----
3 matches found in sequence:
q9kw88 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw88 check: 4855 from: 1 to: 173

ID Q9KW88 PRELIMINARY; PRT; 173 AA.
AC Q9KW88;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=164-1;
RX Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216 (2001).
DR EMBL; AB040128; BAB07890.2; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 173 173
SQ SEQUENCE 173 AA; 19121 MW; 42F5822DE3B01F1F CRC64;

Q9KW88 Length: 173 September 1, 2004 07:07 Type: P Check: 4855
Found using 'seq23' (hayes346.key)
...
```

```
13 ILNPNSESAPGLSDKLNLTIQDDAYIPKYDSNGTSDIEQHDVNLNFFVYLDQKVPEG 63 66
|---|
73 ENNVNLTSSIDTALLEQPKIYTFSSSEFINNVNKPQAAALFVGWIQQVLVDFTTTEANQKS 93 96
|---|
133 TVDKIADISIVVPYKGLNIGNEAQKGNFKDALELLGAGI 146
|---|
-----
3 matches found in sequence:
q9kw89 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw89 check: 5007 from: 1 to: 173

ID Q9KW89 PRELIMINARY; PRT; 173 AA.
AC Q9KW89;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=5545;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216 (2001).
DR EMBL; AB040126; BAB07888.2; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 173 173
SQ SEQUENCE 173 AA; 19137 MW; 4178024F5BC4BF1F CRC64;

Q9KW89 Length: 173 September 1, 2004 07:07 Type: P Check: 5007
Found using 'seq23' (hayes346.key)
...
13 ILNPNSESAPGLSDKLNLTIQDDAYIPKYDSNGTSDIEQHDVNLNFFVYLDQKVPEG 63 66
|---|
73 ENNVNLTSSIDTALLEQPKIYTFSSSEFINNVNKPQAAALFVGWIQQVLVDFTTTEANQKS 93 96
|---|
133 TVDKIADISIVVPYKGLNIGNEAQKGNFKDALELLGAGI 146
|---|
-----
3 matches found in sequence:
q9kw90 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw90 check: 5055 from: 1 to: 173

ID Q9KW90 PRELIMINARY; PRT; 173 AA.
AC Q9KW90;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
```


720 SYOMDLSYQADAKAKIDLEYKKYSGDKENIKSQVENLKNSLDKVKGISEAMNINKFI
721 724
780 RECSVYLFQMLPKV
...
877 NTLMDTSGYNAEVRVEGNVQLNPIFPDFKLGSSGDDRGKVIIVTONENIYVNAMEYFSFI
927 931
937 SFWIRINKWVSNLPGYTIIDSVKNNSCWSIGIISNLFVFTLKQENSEQDINFSDISK
952
997 AAGYNKWFVFTITTNMNMNMIYINGKLIDTIKVKELTGINFSTITFQMNKIPNTGLIT
1000
1057 SDSDNINMWIRDFYIFAKELDKDINILFNSLQYTNVQYWGNDLRYDKXYMNVNYM
1070 1090
1117 NRYMSKKGIVFTRKNNDPNEGKILIKIRKCNTRNDTRVGENVLYFTTIIDNKQYS
1142
1177 LGMVKPSRNLGTLVPLGALDQPMDEIRKYGSGFTIQPCNTFDYVASQLFLSSNATTNRLG
1206
1237 ILSIGSYFKLGDYWFNHYHLYIPVIKIEHYASLLESTSTHWFVFPASE
1267

24 matches found in sequence:
q9lbr2 ; NTNHA.
(from "bt_spt.pep")
TOIG of: q9lbr2 check: 3846 from: 1 to: 1196
ID Q9LBR2 PRELIMINARY; PRT; 1196 AA.
AC Q9LBR2;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE NTNHA.
GN NTNHA.
OS Clostridium botulinum.
OC Bacteria; Firmacutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90660.1; -
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_g1.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; I.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.

SQ SEQUENCE 1196 AA; 138454 MW; 5415088FF959513A CRC64;
Q9LBR2 Length: 1196 September 1, 2004 07:07 Type: P Check: 3846
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNFLSQDSERENFLQAIITLLKRINNTISGKQLLSLISTAIPFYGYVGGGYSS
110
120 PNIFTGKTPKSNKKNLSLVTSTIPFPFGGYRETYIESQNNKNFYASNIVI FPGGSNIV
180 ENNVICYKKDAENGMGMAEILFPQLLTYKYNKFYIDPAMELTCKLKSILSYELYGKPS
211
240 DDLVVPYRLRTELDNKQFSQLNIIDLLISGGVDLEFINTNPYWFNTSYFSNSIKWFEKYK
298
300 NIYETEIEGNAIGNDIKLRKOKFQNSVQDIWNLNLNLYFSKEFNSIIPDRFSNALKHY
301
360 RKQYTYMDYGDYNNINGFVNGQINTKLPLSDKNTNIISKPEKVVNLVANNISLMKSNYI
363
420 GDGLKGTTEDFYSTYKIPYNEEYERENDSDNFPNNISIEEVDISIPEIIDINPYKONS
431
480 DLLFTQITSTTEEVITHALPVNYLQAIITNENFTLSSDFSKVSSKDKSLVYSFLDNL
503
540 MSLYLETIKNDGPIDTDKKYYILWLKEVFKNYSFDINLTQEI DSSCGINEVWTFGKALNIL
558
559
600 NTSNSFVEEYQNSGPISLISKONLSEPNIEIDDI PDSLLGLSPKDLNNKLYEYSKNRV
651
660 YFRKIYENFLDQWWTYYYSQVFEIICMAKQSILAQESVWKQIIQNKFTDLSKASIPDPTL
665
677 680
720 KLIKETTEKTFIDLSNESQISMARVDNFLNKASICVFVEDIYPRFISYMEKYINNINIKT
761
780 REFIORTCINDEKSLINSYTFKTIIDFKELNIQAIKNFNSQVEQVMKEMLSFYQLLL
835
840 FATRGPSNIIEDISGKNTLIQYTESVELVYGVNGESLYLKNPNETVEF
...
914 DDKTRLGNKVNCGWEIYFEDNGLVFEIIDSNGNQESVYLSNVNNNNWYIYSIVDRLK
964
974 DQLLIFINDKNVANVSIEQIILNIYSTNVISLVKNKNSIYVEELSVDKPVASEEVIRNYF
1032

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(from "bt_spt pep")
TOIG of: q9lbr4 check: 9181 from: 1 to: 146

ID Q9LBR4 PRELIMINARY; PRT; 146 AA.
AC Q9LBR4;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-17.
DE HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
ON NCBI_TaxID=1491;
RX [1] SEQUENCE FROM N.A.
RN STRAIN=D-4947;
RC Sagané Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90658.1; --
DR InterPro; IPR008903; Botulinum_HA-17.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SQ SEQUENCE 146 AA; 16704 MW; 0D3115E48B2AA6A7 CRC64;

Q9LBR4 Length: 146 September 1, 2004 07:07 Type: P Check: 9181
Found using 'seq23' (hayes346.key)

1 MSERTFLENGNYKIKSLFSDSLYLYSSGSLFNTSSLDNQKWKLEYISSNGFRFSN
24 27
|---|
67 70 73 76
70 73

51 VAEPNKYLAYNDYGFILYSSSSNNLSLWNPPIKAINSYICTLSIVNVTYAWTIYDNNNN
67 70 73 76
70 73

221 ITDQPI

...

9 matches found in sequence:
q9lbr5 ; HA-70.
(from "bt_spt pep")
TOIG of: q9lbr5 check: 4116 from: 1 to: 623

ID Q9LBR5 PRELIMINARY; PRT; 623 AA.
AC Q9LBR5;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA-70.
DE HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
ON NCBI_TaxID=1491;
RX [1] SEQUENCE FROM N.A.
RN STRAIN=D-4947;
RC Sagané Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90657.1; --
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.

```

DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
SQ SEQUENCE 623 AA; 70311 MW; DF4D7860465E48CE CRC64;

Q9LBR5 Length: 623 September 1, 2004 07:07 Type: P Check: 4116
Found using 'seq23' (hayes346.key)
...
20 NLADGVVNRGDCWILSRQNLGNISNNGCTAIVGDLRIRETATPYYPYPTASFNEEY
70 73
80 IRNVQVNFANFTEASEIPIGFERSKTPSNKGLYMYLQYIYRIYEILKVLNRNIVIERAV
114 119 124
116 121
140 LYVPSLGVAKSIERNSEGEIDKNFYFTSEOKCILNEKEFIYKKIAETTTAKESDNNNTTN
179
200 LNTSQTLIPYNGLYVINKGDMYRTNDKDLIGTLTETNTSGSIIQPLRNTTRPLENT
260 SNPTLFSQETEARLDAFNQLENTSTTLTKFVEAPDNKISMKAYNYEYKELINYO
269 307 313
320 NGNIADKAEYVPLSGKCVSDAPSPQAPVETPVEQDQPIQTGNENIIVGVINPSENI
380 EEISTPDDTYNTIPTSIQNNACYVLFTNTTGVYKINQANLPLLIYESIGSDNNNI
404 429
440 QSNLTSNNIKAINVITGDSNAESVLIVSLIKNKYIYIRIPOISSSTTNQLIFKRELG
466 478
500 NISDLANSTWILDNLTSGTHYTTROSPDVGVNIYSYQLTIPGDFNNIASSIFSFRTRNN
533
560 QGIGTLRLTESINGYLNLIITKKNVSDLLNVEPISLLNGATYIPRVKVTENNNIIFDA
575 583 613
620 YRNS

9 matches found in sequence:
q9lbr6 ; ORF-22 (RNA polymerase sigma factor).
(from "bt_spt.pep")
TOIG of: q9lbr6 check: 5142 from: 1 to: 179

ID Q9LBR6 PRELIMINARY; PRT; 179 AA.
AC Q9LBR6;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORF-22 (RNA polymerase sigma factor).
GN ORF-22
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Segane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,

RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947.";
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90856.1; -;
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22104 MW; B1DFBD424044DDFA CRC64;

Q9LBR6 Length: 179 September 1, 2004 07:07 Type: P Check: 5142
Found using 'seq23' (hayes346.key)
...
1 MNDLYAIEENLKHNDQHFDEIEMSLKKYIEKTSKYNLYDYNDILYHLWKELIEINLK
36 39 43 46 51
39 42
40 43
61 NFNSELDRLRYVISTIKRYCINICKKKNRDKKIYNSEATYKKLEAVNVVSYLCEDEFFL
101 110
121 DLASILNKEKQIYMKPFECRKNDEIARLHLRSQSIYKIRIKSLKLYPIVMQLVNI
135 170

27 matches found in sequence:
q9lbr7 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q9lbr7 check: 1026 from: 1 to: 1280

ID Q9LBR7 PRELIMINARY; PRT; 1280 AA.
AC Q9LBR7;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
GN NT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Segane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89713.1; -;
DR PIR; A43503; A43503.
DR HSPP; P10845; 3BTA.
DR MEROPS; M27.002; -;
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:coxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Pept M Zn BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147757 MW; DE124FFB6F68450B CRC64;

Q9LBS7 Length: 1280 September 1, 2004 07:07 Type: P Check: 1026 ..
Found using 'seq23' (hayes346.key)

...

58 LNKPRVTSKSGYDPNVLSTDSKDTFLKEILKLFKRINSREIGEELIYRLATIDPFP
108

118 GNNNTPIINTDFDVFNSVDVKTRQGNVWKTGSINPSVIITGPRENIIDPETSTFKLTN

178 NTFAAQEGFGALSIISIPRFMLTISNATNNVCEGRFSKSEFCMCDPILIMHNLHAMEN
202

238 LYGIATPNDRISSTVTSNIFYSQYKVKLEVAEIAFYAGGPTIDILPKSARKYFEEKALDYV
239 258 267 297

298 RSLAKRLNSITTANPSSFNKYIGEYKQKIRKYRFVSSGEVADVDRNKPFAELYKELTOI
300 330

358 FTEFNKYKIYNQNRKIYLSNVYTPVTANILDDNVYDIQNGFNIPKSNLNVLFMGQNLGR
363 380

418 NPALRKVPENMLYLF

...

466 IGDIDIKTDIFLSKDNBETEVIDYDQVNSVDQVILSKNTSEHGDLILYPIEGESQV
516

526 LPGENCVFYDNRQNVLYNSVYLSQKSLDNVEDFTTTSIEALDSNGKYTYTPFKL
547 579

586 ADKVNVTGQGLFLAWANDVVEDFTTNILRKDTLKDIDVSAIPIYIGPALNLSNVRRG

646 NTEAFVNTGVTILLEAFQFTIPALGAFVIYSKVQERNEIITKIDNCLEQRIKRWKDSY
677 705

706 EWMIGTWLSRITTOFNFNISYQVYDLSNYQADAIFKDKIDLEYKYSQSDKENIKSQVENLK
708 725 746

766 NSLDIKISEAMNINKFIRECSVTYLFKNMLPKV

...

878 NKKNALVDTSYNAEVRLEGDVQVNTIYTNDFKLSSGDKIIVNLANNILYSAIYENSSV
928

938 SFWIKISKDLTNSHNEYTIINSIKQSGMKLCIRNGNIEWILQDINRKYKSLIFDYSESL
954 986

998 SHTGYTNKWFVFTITNNIMGYMKLYINGELKQSERIEDLNEVKLDKTIIVFGIDENIDNQ
1018

1058 MLWIRDFNIFSKELSNEDINIVVEGGILNRVIKDYWGNPLKFDTEYIINDNYIDRYIAP
1103

1118 KSNILVLQVYPRSKLYTGNPTIKSVSDKNPYIRILNGDINMFHMLYNSGKWIIRDTD

1178 TIYALBGRCSKNCVYALKQSLGNIGYIGFISIKNIVSQNKYCSQIFPSFMKNTMLLAD
1239 1250

1238 IYKPRFSPFNAYTPVAVTNYETKLLSTSSFWKFIISRDPGWVE
1239 1250

24 matches found in sequence:
q9lbs8 : NTNHA.
(from "bt_spt pep")
TOIG of: q9lbs8 check: 4604 from: 1 to: 1196

ID Q9LBS8 PRELIMINARY; PRT; 1196 AA.
AC Q9LBS8;
DT 01-OCT-2000 (TREMBLrel. 15, Created)
DT 01-OCT-2000 (TREMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMBLrel. 25, Last annotation update)
DE NTNHA.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89712.1; ..
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR Prodom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1196 AA; 138457 MW; DEB13981A2B057C0 CRC64;

Q9LBS8 Length: 1196 September 1, 2004 07:07 Type: P Check: 4604 ..
Found using 'seq23' (hayes346.key)

...

60 DGGIYDSNLSQDSERENFLQAIITLLKRINNTISGKQLLSLISTAIPFPYGVGGYSS
110

120 PNIPTFGKTPKSNKKNLSLVSTIPTPPFGGYRETNVIESPNKKDFVASNIVIFGPGSNIV

180 ENNVICYKKNDAENGMTMAEILFQPLLTYKYNKFYIDPAMELTCKLIKSLYFLYGKPS
211 231

240 DGLWVPYRLRTELDNKQFSQLNIIDLLISGGVDLEFINTNPYWFNTSNYSNSIKMPEKYK
298

300 NIYETEIEGNAIGNDIKLRKQKQNSVQDIWNLNLYNFSKFNFSIIPDRFSNALKHFY
301

360 RKQYTYMDVTDNWNINGFVNGQINTKPLPSDKNTNIIISKPEKVVNLVNNENISLMKSNY
363

```

420  GDGLKGTTEDFYSTYKIPYNEEYRENDSDNPLNNISIEVDSIPEIIDINPYKNSD
      |--|
      431
480  NLVFTQITSMTEVTHPALPYNLQQAQITTNENFTLSSDFSKVSVSKDKSLVYFSLDNL
      |--|
      503
540  MSLYLETINKDGPIDTDKKYILWLKVEFKNYSFDINLTQETDSSCGINEVWFGKALNIL
      |--|
      558
      559
600  NTSNSFVEEYQNSPISLSKKONLSEPNIEIDIPDLSLLGLSPKDLNKKLYEYISKNIV
      |--|
      651
660  YFKKIYFNFLDQWMTYYSQVFELICMAKQSILAQESLVKQIIQNKFDTLSKASIPDPTL
      |--|
      665
      677
      680
720  KLIKETTEKTFIDLSKESQISMRVDFNLKASICVFVEDIYPKFISYMEKYINNINIKT
      |--|
      761
780  REFIQRCNTINDNKESILINSYPTKTIDFKELDIQGIKNFPNSQVEQMKEMLSFYQLLL
      |--|
      835
840  FATRGPNSNIIEDISGKNTLIQYTESVELYGVNGESLYLKSPNETVEF
      |--|
      835
...
914  DDKTRLIGNKVNCGWEIYFEDNGLVFEIIDSNGNQESVYLSNVINNWWYISISVDRSK
      |--|
      964
974  DQLLIFINDKNVANVSTEQIILNIYSTNVISLVNKNKNSIYVEELSVLDKTVTSEVIRNYP
      |--|
      1032
1034 SYLDNSYIRDSSKSLLEYNNKYNLYNVPFKTSLYEVDNKNKSLKNTDGINIPSVKFP
      |--|
      1035
      1055
      1058
      1077
1094 KLINIDESKGYVQKWDECIICVSDGTEKTYLIDISSENNRIQLVSSKDNAKKITVNTDLFRP
      |--|
      1122
1154 DCITPFSYNDKYFSLSLRDGYNMICNDNNKNKVPKGAHLWILES
      |--|
      1164
      1174
-----
5 matches found in sequence:
q9lbs9 ; HA-33.
(from "bt_spt.pep")
TOIG of: q9lbs9 check: 79 from: 1 to: 286

ID Q9LBS9 PRELIMINARY; PRT; 286 AA.
AC Q9LBS9;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DR 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DE 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

-----
5 matches found in sequence:
q9lbs9 ; HA-33.
(from "bt_spt.pep")
TOIG of: q9lbs9 check: 79 from: 1 to: 286

ID Q9LBS9 PRELIMINARY; PRT; 286 AA.
AC Q9LBS9;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DR 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DE 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

```

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OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89711.1; -
DR InterPro; IPR008997; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 6.
DR SMART; SM00458; RICIN_2.
DR PROSITE; PS0231; RICIN_B_LECTIN; 2.
DR SEQUENCE 286 AA; 33760 MW; D5F5ABC553A5F25B CRC64;
SQ
Q9LBS9 Length: 286 September 1, 2004 07:07 Type: P Check: 79
Found using 'seq23' (hayes346.key)
...
42  LGSNQKRLIYDTNKQAYKIKVMDNTSLILTWDAPLSSSVKTDNTNNQWYLLQDYIS
      |--|
      92
      95
102  RNVILRNYMNPVLQYNTDSDLIVSTQTSNNOFFKFSNCIYEALANNRNCKLOTQLNSD
      |--|
      144
162  RFLSKNLNSQIIIVLQWQFSDSSRQKWLIEYNETKSAYTLKCOENNRNYLTWICNSNNYVETY
      |--|
      207
222  QSTDLSLYWNINYLNDASKYILYNLQDTRNVLVDVNSQIANGTNNVIVDSYHGNTNQW
      |--|
      230
      243
282  IINLI
-----
4 matches found in sequence:
q9lbt0 ; HA-17.
(from "bt_spt.pep")
TOIG of: q9lbt0 check: 9099 from: 1 to: 146

ID Q9LBT0 PRELIMINARY; PRT; 146 AA.
AC Q9LBT0;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DR 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DE 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
GN HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89710.1; -
DR InterPro; IPR008903; Botulinum HA-17.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SMART; SM00458; RICIN; 1.

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SQ SEQUENCE 146 AA; 16651 MW; E245CCB5DF905899 CRC64;
Q9LBT0 Length: 146 September 1, 2004 07:07 Type: P Check: 9099
Found using 'seq23' (hayes346.key)
1 MSBRTFLPNGYKIKLFSNLSLYLTYSSGALSFSNTSSLDNKKWLEISSNGRFRSN
24 27
121 ITDQPI
67 70 73 76
61 VAESNKLAYNDYGFYLLSSSSNNSLWNPILKAINSVYIICLTLSIVNVTDYAWTYIDNNNN
70 73
121 ITDQPI
67 70 73 76
19 matches found in sequence:
q9lbt1; HA-70.
(from "bt_spt.pep")
TOIG of: q9lbt1 check: 4754 from: 1 to: 623
ID Q9LBT1 PRELIMINARY; PRT; 623 AA.
AC Q9LBT1;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-JUN-2003 (TREMBlrel. 24, Last annotation update)
DE HA-70.
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89709.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; C:clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTERTOXN.
SQ SEQUENCE 623 AA; 70252 MW; 83BEC67E689F7CD5 CRC64;
Q9LBT1 Length: 623 September 1, 2004 07:07 Type: P Check: 4754
Found using 'seq23' (hayes346.key)
20 NLADGNYVNRGDGWLRSQNQLGGNISNGGTAIVGLRIRRETATPYYPASPNEEY
70 73
80 IRNNQVNFANFEASEIPIGFEFSKTPASNKSLQVLYQVYIRVEIKVLQNTVIERAV
114 119 124
116 121
140 LYVPSLGVKSIENFSGEQIDKNFYFTSEDCILNEKFTYKIAETTTAKESNDSNNTTN
179

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200 LNTSQTLPPNGLYVINKDGMRTNDKDLIGTLLETNTSGSIIQPRIRNTRPLENT
260 SNPTLFSQRYTEARLNDAFNIQLFNTSTALFKFVEEAPDNKNISMKAYNTYKYLINYQ
269 307 313
310
320 DGNIAKAEYLLPSLGKCEVSDAPSPQAFVETPVDQDGFQIQTPNENIIVGVNPSNI
380 EBISTPDDTYNTIPTSIQNACVULFTVNTGVYKINAKNNLPLLIYESIGSDNNI
404 429
440 QSNLTLSNNNIKAINYITGTDSANARSYLIVSLIKKNKYVIRIPOISSSTTNQLIFKRELQ
466 478
500 NISDLANSTVNILDNLTSGTHYTRQSPDVGNYSYQLTIPGDFNNIASSIFSFRNN
533
560 QGIGTLYRLTESINGYNLITIKNYSDDLNVBPISLLNGATYIFRVKVTNELNNYNIIFDA
575 583 613
620 YRNS
-----
9 matches found in sequence:
q9lbt2; ORF-22 (RNA polymerase sigma factor).
(from "bt_spt.pep")
TOIG of: q9lbt2 check: 6185 from: 1 to: 179
ID Q9LBT2 PRELIMINARY; PRT; 179 AA.
AC Q9LBT2;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE ORF-22 (RNA polymerase sigma factor).
GN ORF-22.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89708.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22102 MW; 2285A9CD1BF2C7BB CRC64;
Q9LBT2 Length: 179 September 1, 2004 07:07 Type: P Check: 6185
Found using 'seq23' (hayes346.key)
1 MNDLFVAIENLKHQNFHFIEMSLKKYIEKTSKKYNLYVDYNDILYHLWKELIEINLK
36 39 43 46 51
39 42
40 43
61 NFNSELDLRKYISTISKRYCINICKKNRDKKIYNSEVYTKKLDVAVNYSLYCDNFEL
101 110

```

121 DLISILNYKEQIIYMKFFECRKDNEIARRILHSRQSIYKIRIKSLKKLYPIVMQLVNI
135
170

25 matches found in sequence:

q9tg7 ; NTX (Fragment).

(from "bt_spt.pep")

TOIG of: q9tg7 check: 8808 from: 1 to: 1275

ID Q9QTG7 PRELIMINARY; PRT; 1275 AA.

AC Q9QTG7;

DT 01-MAY-2000 (TrEMBLrel. 13, Created)

DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)

DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)

DE NTX (Fragment).

GN NTX.

OS Clostridium botulinum D bacteriophage.

OC Viruses.

OX NCBI_TaxID=29342;

RN [1]

RP SEQUENCE FROM N.A.

RC STRAIN=1873;

RX MEDLINE=99017546; PubMed=9802560;

RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,

RA Ohyama T., Watanabe T., Inoue K., Oguma K.

RT "Molecular composition of the 16S toxin produced by a Clostridium

RT botulinum type D strain, 1873."

RL Microbiol. Immunol. 42:599-605 (1998).

DR EMBL; AB012112; BAA75084.1; -

DR HSP; P10845; 3BTA.

DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.

DR GO; GO:0008237; F:metallopeptidase activity; IEA.

DR GO; GO:0015070; F:toxin activity; IEA.

DR GO; GO:0008270; F:zinc ion binding; IEA.

DR GO; GO:0009405; P:pathogenesis; IEA.

DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.

DR InterPro; IPR008985; ConA-like lec_gl.

DR InterPro; IPR002160; Kunitz legume.

DR InterPro; IPR006025; Peptidase_M27.

DR Pfam; PF01742; Peptidase_M27; 1.

DR PRINTS; PR00760; BONTOTOXILYSIN.

DR ProDom; PD001963; Bontoxilysin; 1.

DR PROSITE; PS00142; ZINC_PROTEASE; 1.

FT NON_TER 1275 1275

SQ SEQUENCE 1275 AA; 146742 MW; 3CS0F46C8233E2D6 CRC64;

Q9QTG7 Length: 1275 September 1, 2004 07:07 Type: P Check: 8808 ..

Found using 'seq23' (hayes346.key)

1 MTWPKVFNYSDFVNDNLDILRIPQNKLIITPVKAFMITONIWIPERFSSDTPNPSLSK
21 24

61 PPRPTSKYQSYDPSYLSSTDQKDTFLGKILKPKRINERDIGNKLIINLVGSPFMGDS
68 71 109

121 STPDETFDTRHTTNAIEKPEKNGSKVNTNIITPSVLIFGLP

247 KRIRPQSEGFSGDGNVPQPEELYTFGLDVEIIPQIERSQLREKALGHYKDKAKRLNN
297

307 INKTIPSSWISNIDKYKIFSEKYNFKDNTGNFVNIDKFNLSYSLDNTVMSEVYSSQ
322 351

367 YNKNRTHYFSRHYLPVPANILLDDNIYTRDGNLTNKGFNIGNSGQNIERNPALQKLSS

427 ESVVDLF 380

...

480 ETVNQYSDKFLSDLSLDGQVPINPEIVDPLPNVNMPLNLPGEIIVFYDDITKIVDY 530 536

540 LNSYLYLESQKLSNNVENITLTTSVEEALGYSNKIYTFPLSLAEKVNKGVOAGFLNAN 543 575

600 EVVEDFTTNIMKKDLDKISDVSVIIPIYIGPALNIGNSALRGNFENQAFATAGVAFLEGF

660 PEFTIPALGVFTFYSSIOEREKIITKIENCLQQRVKRWKSDSYQMMVSNWLSRITTFQFNHI 673 701

720 NYQYDLSYQADAKAKIDLEYKYSKSDKENIKSQVENLKNSLDKVISEAMNNINKFI 721 742

780 RECSVTYLFEKNMLPKV 724

...

874 NKKNALVDTSGYNAERVRGDNVQLNTIYTNDFKLSSSGDKIIVNLNNNILYSALYENS SV 924

934 SFWTKISKDLTNSHNEYTIINSIEQNSGWKLCIRNGNIEWILQDVNRYKSLIDFYSES L 950 982

994 SHTCYTNKWFVTITNIMGYMKLYINGELKQSQKIEDLDEVLDKTIVFGIDENIDENQ 1014

1054 MLWRDFNIFSKELSNEDINIVBEGQILRNVIKDYGNPLKFDTEYTIINDNYIDRYIAP 1099

1114 ESNVLVLVQVPDRSKLYTGNPITIKSVSDKNPYSRILNGDNIIHLMLYNSRKYMLIRDT D 1146 1166

1174 TIYATQGECSQNCVYALKQLQSNLGNYGIGFISIKNIVSKNKGCSQIFSSPRENTMLIAD

1234 IYKFWRFNFKNAYTPVAVTNYETKLLSTSSFWKFIISRDPGWV 1235 1246

2 matches found in sequence:

q9r540 ; Neurotoxin heavy chain 18 kDa fragment (Fragment).

(from "bt_spt.pep")

TOIG of: q9r540 check: 7100 from: 1 to: 72

ID Q9R540 PRELIMINARY; PRT; 72 AA.

AC Q9R540;

DT 01-MAY-2000 (TrEMBLrel. 13, Created)

DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)

DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)

DE Neurotoxin heavy chain 18 kDa fragment (Fragment).

OS Clostridium botulinum.

OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

OC Clostridium.

OX NCBI_TaxID=1491;

RN [1]


```
RP SEQUENCE.
RX MEDLINE=94000342; PubMed=8397793;
RA Gimenez J.A., DasGupta B.R.;
RT "Botulinum type A neurotoxins digested with pepsin yields 132, 97, 72,
RT 45, 42, and 18 kD fragments."
RL J. Protein Chem. 12:351-363(1993).
DR HSSP; P10845; 3BTA.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR InterPro; IPR002160; Kunitz_legume.
SQ SEQUENCE 72 AA; 8165 MW; B7A959576A615E18 CRC64;

Q9R540 Length: 72 September 1, 2004 07:07 Type: P Check: 7100 ..
Found using 'seq23' (hayes346.key)

1 IYINSLYRGTKFIILKKYASGNKDNIRNRDRIYINVVVKNKEYRLATNASQAGVEKILS
34 37 44 47
61 ALEIPDVGNLYQ

-----
2 matches found in sequence:
q9r5h0 : Type E neurotoxin, type E NT=16 kDa fragment (Fragment).
(from "bt_spt.pep")
TOIG of: q9r5h0 check: 8046 from: 1 to: 60

ID Q9R5H0 PRELIMINARY; PRT; 60 AA.
AC Q9R5H0;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Type E neurotoxin, type E NT=16 kDa fragment (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE.
RX MEDLINE=93000392; PubMed=1388670;
RA Gimenez J.A., DasGupta B.R.;
RT "Pepsin fragmentation of botulinum type E neurotoxin: isolation and
RT characterization of 112, 48, 46, and 16 kD fragments."
RL J. Protein Chem. 11:255-264(1992).
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR InterPro; IPR002160; Kunitz_legume.
FT NON_TER 1 1
FT NON_TER 60 60
SQ SEQUENCE 60 AA; 6865 MW; 9EA8C4CABFEAE766 CRC64;

Q9R5H0 Length: 60 September 1, 2004 07:07 Type: P Check: 8046 ..
Found using 'seq23' (hayes346.key)

1 LANRLYSGLKVKIQRYNNSSTNDNLVRKNDQVYINVFASKTHLFLPYADTATTNKKYIK
6 9 33 36
61

-----
1 match found in sequence:
q9r5n5 : Neurotoxin type B HN+ 35 kDa SUBUNIT-BAND 3B (Fragment).
(from "bt_spt.pep")
TOIG of: q9r5n5 check: 7044 from: 1 to: 13

ID Q9R5N5 PRELIMINARY; PRT; 13 AA.
AC Q9R5N5;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE Neurotoxin type B HN+ 35 kDa SUBUNIT-BAND 3B (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
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OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE.
RX MEDLINE=92143938; PubMed=1781887;
RA Somers E., DasGupta B.R.;
RT "Clostridium botulinum types A, B, C1, and E produce proteins with or
RT without hemagglutinating activity: do they share common amino acid
RT sequences and genes?";
RL J. Protein Chem. 10:415-425(1991).
DR PIR; G44644; G44644.
FT NON_TER 13 13
SQ SEQUENCE 13 AA; 1539 MW; 00DB6E78247E2054 CRC64;

Q9R5N5 Length: 13 September 1, 2004 07:07 Type: P Check: 7044 ..
Found using 'seq23' (hayes346.key)

1 MSTYQNILNDKIV
4 7

-----
7 matches found in sequence:
q9r631 : Neurotoxin type B light chain, BONT/B.
(from "bt_spt.pep")
TOIG of: q9r631 check: 4044 from: 1 to: 451

ID Q9R631 PRELIMINARY; PRT; 451 AA.
AC Q9R631;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin type B light chain, BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=92340509; PubMed=1634516;
RA Kurazono H., Mochida S., Binz T., Eisel U., Quanz M., Grebenstein O.,
RA Wernars K., Poullain B., Tauc L., Niemann H.;
RT "Minimal essential domains specifying toxicity of the light chains of
RT tetanus toxin and botulinum neurotoxin type A."
RL J. Biol. Chem. 267:14721-14729(1992).
DR HSSP; P10845; 3BTA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0003405; F:proteolysis; IEA.
DR GO; GO:0003405; F:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 451 AA; 51943 MW; 6C79FD488653EA71 CRC64;

Q9R631 Length: 451 September 1, 2004 07:07 Type: P Check: 4044 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNFNNDPIDNNNIMMEPPFARGTGRYYKAFKITDRWIIPERYTYFGYKPEDFN
33 36 34 37
61 KSGGIFNRDVCVEYDDYLDYLTNDNKKNI
...
149 ERKKGIFANLIIFGPGFVLNENETIDIGIONHFASREGFGGIMQMKCPCEYVSVFNNVQE
149
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209  NKGASIFNRRCYFSDPALILMHILHVLHGLYGIKVDLPIVVPNEKKFFMQSTDAIQABE      199
269  LYTFGGQDPSIIPTSTDKSIYDKVLQNFGRGIVRLNKVLVCISDPSININITYKNKFKDKY      328
--|  KFEVDSBGKYSIDVESFDKLYKSLMFGFTETNTNAENYKIKTRASYFSDSLPPVKIKNLLD      331
--|  NEIYTBEEGFNISDKMEKEYRGONKAINQAYEEISKEHLAVYKIQMCKSVKAPGICID      421
449  VDN
-----
13 matches found in sequence:
q9r761 ; HA-70 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9r761 check: 7747 from: 1 to: 442

ID Q9R761 PRELIMINARY; PRT; 442 AA.
AC Q9R761;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA-70 protein (Fragment).
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins.";
RL Curr. Microbiol. 37:312-318(1998).
DR EMBL; Y13630; CAA73963.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
FT NON TER 442
SQ SEQUENCE 442 AA; 50255 MW; 6DE1BF01EEBF832B CRC64;

Q9R761 Length: 442 September 1, 2004 07:07 Type: P Check: 7747
Found using 'seq23' (hayes346.key)

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1  MNSSIKKIYNDIOEKVINSYDTIDLADGNVVRGDCGWILSRQNIILGSGSVISNGSTGIV      9 12
61  GD
...
68  NAIPYYPTPSFNEEYIKNNIQVTNFTNTEANQIPIGYFESKTAPSNKNLYMYLQYTYIR      118 123
--|  120 125
--|

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128  YEIIKVLQHEIIRAVLYVPSLGYVKSIEFNPGEKINKKDFYFLTNDKCILNEQFLYKKIL      183
128
188  ETTKNIPTNIFNSKVSSTQRLVPYSNGLYVINKDGYVIRTNDKDLIGT
...
260  PTTSDNTKFSQQYTEERLKDQAFNVQLFNTSTSLPKFVEEAPSDKNICIKAYNTYKVELI      310 316
--|  313
--|
320  DYQNGSIVNKAEEYVPSLGYCEVTINAFSPSEVVVMQVAEDGFIONGPEEEIVVGVIDPS      339
380  ENIQEINTAISDNIYISIPGIVNNNNPFIILFTVNTTGTGIYKINAQNLPPLKIYEAGSGN      407 432
--|
440  RNM
-----
7 matches found in sequence:
q9r772 ; Ha-17 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9r772 check: 2875 from: 1 to: 158

ID Q9R772 PRELIMINARY; PRT; 158 AA.
AC Q9R772;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Ha-17 protein (Fragment).
GN HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Eklund 17B;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214(1997).
DR EMBL; Y09312; CAA70496.1; -.
DR InterPro; IPR008903; Botulinum_HA-17.
DR Pfam; PF05588; botulinum_HA-17; 1.
FT NON TER 1
SQ SEQUENCE 158 AA; 18517 MW; 0A24EDA3D543E8B2 CRC64;

Q9R772 Length: 158 September 1, 2004 07:07 Type: P Check: 2875
Found using 'seq23' (hayes346.key)

```

```

1  EYHLIYKEVNYMSVERTFLPDGNYNIKSIIFSGLYLNPVSGSLTFSSSSANNQKNWE      2 5 7 10 15
--|  3 6
--|
61  YMAKRCFKISNVAEPNPKYLSYDNFGFISLDSLNKCYWFPKIAVNTYMLNLKNVEL      79 82
--|  82 85
--|
121  DYAWDIYDTNENILSQPLLLLPNFDIYNSQMLKLEKI

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-----
13 matches found in sequence:
q9r773 : Ha-70 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9r773 check: 8038 from: 1 to: 442

ID Q9R773 PRELIMINARY; PRT; 442 AA.
AC Q9R773;
DT 01-MAY-2000 (TReMBLrel. 13, Created)
DT 01-MAY-2000 (TReMBLrel. 13, Last sequence update)
DT 01-JUN-2003 (TReMBLrel. 24, Last annotation update)
DE HA-70 protein (Fragment).
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (Clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; Y09312; CAA70495.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
FT NON TER 442
FT SEQUENCE 442 AA; 50198 MW; 160A5E4A7E746B84 CRC64;

Q9R773 Length: 442 September 1, 2004 07:07 Type: P Check: 8038
Found using 'seq23' (hayes346.key)

1 MNSSIKKIYNHIOEKVINKVNSDTIDLADGNVYVSRGDGWLRSQNLGGSVISNGSTGIV
9 12
61 GD
...

68 NAIPYYPTPSFNEBYIKNNIQVTFNTEANQIPGFEFSKTAPSNKNLYMYLQYTYIR
118 123
120 125

128 YEIIKVLQHEIIERAVLYVPSLGYVKSIFBNLGEKINKDFELTNDKCILNEQFYKKIL
128 183
188 ETTKNIPTNNIFNSKVSQTVRLPYSNGLYVINKGSGYIRTNKDGLIGT
...

260 FTTSNNTKFSQQYTEERLKDAFNVLNTSTSLFKPVEAPSNNKICIKAYNTYKIELI
310 316
313

320 DYQNGSIINTAEYILSLGYCEVTNAPSSESVVKTQVAEDGFVQNGPREEIVGVDFPS
-----
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339

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-----
380 ENIOEINTAISDNVTYSIPDIVDNNPFIYLVNTTGTGIYKINAQNPLPKIYEAGSSN
407 432
440 KNM

-----
1 match found in sequence:
q9r7d6 : 33kD hemagglutinin (Fragment).
(from "bt_spt.pep")
TOIG of: q9r7d6 check: 7053 from: 1 to: 13

ID Q9R7D6 PRELIMINARY; PRT; 13 AA.
AC Q9R7D6;
DT 01-MAY-2000 (TReMBLrel. 13, Created)
DT 01-MAY-2000 (TReMBLrel. 13, Last sequence update)
DT 01-DEC-2001 (TReMBLrel. 19, Last annotation update)
DE 33kD hemagglutinin (Fragment).
GN HEM33/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=Lamanna;
RA Yang G.H.;
RT "Nontoxic components of Clostridium botulinum type B progenitor
RT toxin.";
RL Submitted (JUL-1996) to the EMBL/GenBank/DBJ databases.
DR EMBL; U63808; AAB64348.1; -.
FT NON TER 13
FT SEQUENCE 13 AA; 1552 MW; 98356108FA6FD041 CRC64;

Q9R7D6 Length: 13 September 1, 2004 07:07 Type: P Check: 7053
Found using 'seq23' (hayes346.key)

1 MEHYSTIQNSLND
4 7

-----
14 matches found in sequence:
q9x708 : Botulinum neurotoxin type B (Fragment).
(from "bt_spt.pep")
TOIG of: q9x708 check: 8570 from: 1 to: 441

ID Q9X708 PRELIMINARY; PRT; 441 AA.
AC Q9X708;
DT 01-NOV-1999 (TReMBLrel. 12, Created)
DT 01-NOV-1999 (TReMBLrel. 12, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=99343691; PubMed=10413679;
RA Lalli G., Herreros J., Osborne S.L., Montecucco C., Rossetto O.,
RA Schiavo G.;
RT "Functional characterisation of tetanus and botulinum neurotoxins
RT binding domains.";
RL J. Cell Sci. 112:2715-2724 (1999).
DR EMBL; AJ242628; CAB43706.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; ConA_like_lec_gl.
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DR InterPro; IPR002160; Kunitz_legume.
KW Neurotoxin.
FT NON_TER 1 41
FT NON_TER 441 441
SQ SEQUENCE 441 AA; 52772 MW; 721D0B468EBC95A4 CRC64;
Q9X708 Length: 441 September 1, 2004 07:07 Type: P Check: 8570
Found using 'seq23' (hayes346.key)

1 YTNNTILIEFNKYSKILNMIILNRYRNNLIDLSGYGANVEYDGVGLNDKKNQPKLT
46 49
61 SSTNSELRVTQNMQLIFNSMFLDPSVFWIRIPKYKNDGIQNYIHNEYTIINCINKNSGW
108
121 KISIRGNRIITWLTIDNGTKSVFFEYSIREDISDYINRWF
...
166 TNSNDNAKIYNGKLESNIDIKDIGEVIANGEIIFKLDGIDRTOFIWMKYFSIFNTELS
216
226 QSNIKEIKYIQSYSEYLKDFWGNPLMYNKYMFNAGNKNSYIKLKKDSSVGEILTESKY
238 256
286 NQNSNTINRNLYIGEKFIIRKKSNSQSIINDIVRKEDYIYLDFFNSRNRWVYVKDFK
291 294 324 326
346 EEEKLVLANIYDSNFFYKTIQIKVEYDEQPTYSCQLLFFKXDEBSTDIGLIGHRFYESG
363
406 TVLKDYNKFCISKWYLKEVKRKPYNPYNLGNQWFI
411 414
-----
33 matches found in sequence:
q9zaj5 ; Bont protein.
(from "bt_spt.pep")
TOIG of: q9zaj5 check: 7881 from: 1 to: 1280

ID Q9ZAJ5 PRELIMINARY; PRT; 1280 AA.
AC Q9ZAJ5;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Bont protein.
GN BONT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins."
RL Curr. Microbiol. 37:312-318 (1998).
DR EMBL; Y13631; CAA73972.1; -.
DR HSSP; P10845; 3BTA.

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DR MEROPS; M27.002; -.
GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
GO; GO:0008237; F:metallopeptidase activity; IEA.
GO; GO:0015070; F:toxin activity; IEA.
GO; GO:0008270; F:zinc ion binding; IEA.
GO; GO:0009405; P:pathogenesis; IEA.
GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
InterPro; IPR008985; ConA_like_lect_gli.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn BS.
PFam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
PRODom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147487 MW; D0F748976EBC222C CRC64;
Q9ZAJ5 Length: 1280 September 1, 2004 07:07 Type: P Check: 7881
Found using 'seq23' (hayes346.key)

1 MPVINSFNYPVNDETILYMQPYEERSKYKAFEIMPVNMWIMPERDTIGTKPDEFQ
33 36
34 37
61 VPDSLKNGSSAYYDPNVLITDAEKDRY
...
149 IISNLLVLGAGPDI EKAYCTPLVRENKSDKLIEPSNHGFGSINILTFSPYEHFNDISG
199
209 GHNSTESFTIADPAISLAHELIALHGLYGAKAVTHKESLVAERGPLMIAEKPIRLSEFL
269 TFGGEDNLIIPSAKMKIYNDLLANYEKIATRLREVTAPPGYDINEYKDYFQWKYGLDR
287 294 316 319
329 NADGSYTVNRNKENIYKLIYSPTEIDLANKFKVKCRNTYFIKYGFVKVFNLLDDDIYTV
345 372
389 SEGFNIGNLAVNRGNQINLNPKIIDSIPDKGLVEKI
...
481 NNYRNMLDEVILDYNSETIPOISNRTILTVQDNSYVPDYDSNGTSEIEYDYDVDFNVFF
531
541 YLHAQKVPGETNISLTSSIDTALLESKVYTFSEFIDTINKPVNAALFIDWISKVIR
541 571
601 DFTTEATQKSTVDKIADISLIVPYVGLNINLVIEAKGNFEAFELLGAGILLEFVPELT
624
661 IPVILVFTIKSYIDSYENKKAIAKAINNSLIERAKWKRIYSWIVSNWLTRINTQPNKRK
701
721 EOMYQALQNVDAIKTAIEYKNNYTSDEKNRLESKNYNINNTIEELNKKVSLAMKNIERF
724 742
781 MTESSISYLMKLINAEAEVGLKEYDKHVKSDDLIDYILYHKLILGEQTKELIDIVTSTLNS

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815
818
863
863
841 SIPPESYTTNDKILIIYFNRLYKKIKDSSILDMRYENKFKIDISGYSNISINGNVIIY
901 STNRNQFGIYSGRLSEVNAQNDIIYNSRYQNFISFVWTIPKHYRPMNRREYTIINC
961 MGNNSGWKISLRTIRDCEIIWTLOQTSNKEKLIIRYBELASISDYINKWIFVITNRR
1021 LGNSRIYINGNLIVEKISINLGDIIHVSNDILFKIVGCDDETGVGIRYKVFNTELDKEI
1081 ETLYSNEPDPSILKDYWGNYLLYKYYLFLNLLRKDKYITRNSGILNINQQRGVGTGISV
1141 FLNKLKYGVEVIIRKNAPIDISNTDNFVRKNDLAYINVDHGVYRLYADISITKSEKI
1201 IXLIRTSNPNDLSGLIIVMDSIGNNCTMWFQNNDSNIGLGFHSDDLVASSWYVNHIR
1261 NTSSNGCFWSFISKEHWKE

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28 matches found in sequence:
q9zaj6 ; Ntnh protein.
(from "bt_spt.pep")
TOIG of: q9zaj6 check: 1987 from: 1 to: 1162

ID Q9ZAJ6 PRELIMINARY; PRT; 1162 AA.
AC Q9ZAJ6;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Ntnh protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_SEQUENCE FROM N.A.
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins ";
RL Curr. Microbiol. 37:312-318 (1998).
DR EMBL; Y13631; CAA73971.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like_lec_gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
SQ SEQUENCE 1162 AA; 135251 MW; 8D0061CDF80CDD9B CRC64;
```

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Q9ZAJ6 length: 1162 September 1, 2004 07:07 Type: P Check: 1987
Found using 'seq23' (hayes346.key)

...
81 ATVKILQRIINNVIAGAKLLSLISTAISFPYEVKPGDYRQTNVLTSKYNEHYVTANLIVFG
131
141 PGSNIKNVVVYKKEAENGMTSEIWFQPFLYKYDQFYVDPALELIKLIKLSLYYL
178
201 YGIKPSDDLSTIPYRLRSELNNSEYQDIDVDFLISGGTDYKLLNTNPNYWTIDNYFSADPK
224
261 NPEKYNDYETKIKNNNDIANSIKLYLEQFKINAQNIWELNLSYFSKEFQIMMPERYNN
318
321 ALNHVYKKEYYGIDYFRNVYNINGPEKGQIKTNLPLSKYNKCIINKPELIVNLINQNTVM
330
381 MKSNIYGDLKCTIDNFYSSYKIPYNANYEHPINYSYLDNVNIEIDKIPPINDADIYPY
398
441 RKNADTFIPVYNIKSKEVNTTTPLPVNYLQVQITDSNDINLSSDFLEVISKGSVYSF
451
501 LANTWDYLESIKYDKPIDTDKYYKWLKAIFRNYSFDITETQEISNQFGVTKIVPWIGRA
523
524
561 LNLINTNNSFMEEFKNL

...
580 ISLINKKENITMPKIEIDEPNSMLNLSFKDISELNFISFKSNYSFKKIYDFLDQWWT
630
631
640 QYYSQYFDLICMAKKSILAQEKLIIKKIIRKKLSYLGNAISSDNLALMNLTTNTLRDI
642
645
700 SNESQIANNVDSFLNDAAICVFSNIYKFIISFMEOCINNINKOTKEFIQKCTNITENE
727
760 KLQLISPNIFSSLDPDFNENIKSLSSSETALLIKEETSPYELVLYAFQELSNNVIGDA
801
820 SGKNTSIEYSKDIGLVYGINSDALYINGSNQISF
...
880 TTKSKLIGSKEDNCGWEIFYQNTGLVFNMDISNGDEKNIYLDVSNNSWHYITISVDRLK
930
940 EQLLIFDDNLVNVNESIKEILNITYSSNIISLLSDNNASVIEGILTILNKPTTGEVLSNYF
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689 RDEKIDMYGLIVAQWLSTVNTQFYTIKEGMYKALNYQAALIEIIKYKINIYSBERSN 738
697 720
749 INIDENDVNSKLINEGINQAIDNINNFINESVSYLMMKMIPLA
...
838 FDLSTYTNTTILIEIFNKYNSDILANNILNLRYDRNKLIDLSSYGAKVEVYDGVKLDKN 888
...
898 QFKLTSSANSKIRVIQONNIIIFNSMFLDFSFSFWIRPKYKNDGIGNYIHNEYTIINCWK 950
950 NNSGWKISIRGNMIITWLLIDNGIKSVFFYSIKEDISEYINRWF
...
1008 TNSDNAKIYINGKLESHIDIRDIREVIANDEIIPKLDGNIDRTQFIWMKYFSIFNTELS 1058
...
1068 QSNIBEIYKIQSYSEYKLDFWGNPLMYNKYNFAGNKNYSYIKLKKDSSVGEILLTRSKY 1109
1080 1098
1128 NQNSKYINRDLYIGEKFTIRKKSNSQSINDDIVRKEDYIYLDFFNLNQEWVYMYKYFK 1183
1133 1166
1136 1168
1188 KEEKLFLAPISDSDEFYNTIQIKEYDEQPTSCYQLLFXKDEESTDEIGLIGHRYESG 1205
1205
1248 IVFKYKDYFCISKWYKWKVKRPYNSKLGCMQWQFIPKDEGWTE 1253
1253 1256
-----
24 matches found in sequence:
q9za9 : Ntnh protein.
(from "bt_spt.pep")
TOIG of: q9za9 check: 3660 from: 1 to: 1197

ID Q9ZAJ9 PRELIMINARY; PRT; 1197 AA.
AC Q9ZAJ9;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Ntnh protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins.";
RL Curr. Microbiol. 37:312-318 (1998).
DR EMBL; Y13630; CAA73967.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.

```

```

DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; Cona like lec gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontokilysin; 1.
SQ SEQUENCE 1197 AA; 138716 MW; 974B4480D6675EBB CRC64;

Q9ZAJ9 Length: 1197 September 1, 2004 07:07 Type: P Check: 3660 ..
Found using 'seq23' (hayes346.key)

...
60 DGGIYDSNFLSQSEKDKFLQAIITLLKRINSTNAGEKLLSLISTAIPPGYGGYGA 110
...
120 PNMITFGSAPKSNKLNLSITIPFVAGYRETNYSLEDNKSFYASNIVIFGPGANIV 147
...
180 ENNTVYKKEDAENGMTWTETWFPQFLTYKYDEYIDPAIELIKLIKSLYFLYGIKES 231
...
240 DDLVIPRLRSELENIEYSOLNIVDLLVSGGIDPKPFINTDPYWFDTNDFSNAKKVFEDHR 257
...
300 NIYETEIEGNN
...
313 GNDIKLRKQKFRININDIWEINLNYFSKEFSIMMPDRFNNAKHKFYRQYKIDYPENY 363
...
373 SINGFVNGQINAQLSLSDRNQDIINKPEIINLLGNVSVLSMRSNYIGDLKSTVDDFYS 431
...
433 NYKIPYNRAYEYHFNNSSLDNVNIGVIDNIPETIDVNPYKENCDFSPVQKITSTRE 434 438
...
493 INTNTPWPINYLQAQNTNNEKFSLSDDFVEVYSSKDKSLVYGSFLSNVMFYLDLSIKDNSPI 503
503 533
...
553 DTDKKYLMLEIFRNYSFDITATQETINTDCGINKVVTWFGKALNLTNTSDSFVEBFQNL 558
558 559
...
615 ISLINKENLSMPEIIEYIGIPNDMLGLPLNDLNEKLFNLYKNILYFKVKYFENFLDQWWT 665
...
675 EYYSOYFDLICMAKQSILAQEKLIQKIQNKIQDLQFKADISMDKLNLMNLATEKTFIDL 677
677 680
...
785 KCTNTEDEKLQLIKNTFMNIDPFDFDIQSIKDLITSETDLIKEKESDYNLFLETLQES 785

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835

845 DNKVIEDISGKNTLVKYSISLVYGVNGDALYLKEPDESVSF

...

914 IITSKLJENKADNCWEIYFENNGLVFSIVDCNGNEENIVLSDVISKNNYISIDRLR
964974 NQLLIFINDKLIANQTEQILNIYSSNTISLVNENNPIYIEGLSILNRSITSEVVNNYF
10321034 SYLNNYSYRDISGERLEVNKTYELNYVFPENSLYEVTENNNIYLSIKDNNLNIOQAKF
1035 1055 10771094 KLINIDANKOVQKWDEGVVCLLDEEKYVDISSENNRIQVLSSKDTAKRIIFNNDFRP
11221154 NCLTFAYNNKYLSSLSLRDRNRYNNWMCNNNNIPKAHLWALKGI
1164 1174-----
6 matches found in sequence:

q9zak0 ; HA-33 protein.
(from "bt_spt.psp")
TOIG of: q9zak0 check: 3410 from: 1 to: 293

ID Q9ZAK0 PRELIMINARY; PRT; 293 AA.
AC Q9ZAK0;
DT 01-MAY-1999 (Tremblrel. 10, Created)
DT 01-MAY-1999 (Tremblrel. 10, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
complex in a strain of clostridium botulinum producing type B & F
neurotoxins."
RL Curr. Microbiol. 37:312-318(1998).
DR EMBL; Y13630; CAA73965.1; -.
DR InterPro; IPR008997; RicinB like.
DR Pfam; PF00652; Ricin B lectin.
DR SMART; SM00458; RICIN_2.
DR PROSITE; PS50231; RICIN B LECTIN; 2.
SQ SEQUENCE 293 AA; 33865 MW; 96E579595D6C802F CRC64;

Q9ZAK0 Length: 293 September 1, 2004 07:07 Type: P Check: 3410 ..
Found using 'seq23' (hayes346.key)

1 MEHYSVLQNSLNDKIVTISCRADTNLFYQVAGNVSLFQOTRNYLERWRIYDSNKAAYK
4 7 29 3261 IKSMIDHNTNLVLTWNAPTHNISQDSDNADNOYWLILDKDIGNNSFIASYPKPNLVIYA
94 97121 DTARNLKLSTLANSNVIKFIIEYIIISDFNNFTCKISPILDRNKVVQVATTNLNVNLY
137181 TDYGRNQKWTIRYNEEKAAYQFENTILSNGVLTFWFSNGNVTVRSSNDQNNDQAYWLI
201 237

241 NPVSDTDTYITINLRDTTKALDLYNSQTANGTAIQVFNSSNGGDNQKNWI

...

5 matches found in sequence:

q9zwv4 ; HA1.
(from "bt_spt.psp")
TOIG of: q9zwv4 check: 1195 from: 1 to: 291

ID Q9ZWV4 PRELIMINARY; PRT; 291 AA.
AC Q9ZWV4;
DT 01-MAY-1999 (Tremblrel. 10, Created)
DT 01-MAY-1999 (Tremblrel. 10, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE HA1.
GN HA1.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RC SEQUENCE FROM N.A.
RP STRAIN=1873, and CH16;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohyanaga T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
botulinum type D strain, 1873."
RL Microbiol. Immunol. 42:599-605(1998).
RN [2]
RC SEQUENCE FROM N.A.
RP STRAIN=CH16;
RX MEDLINE=96025415; PubMed=8569530;
RA Ohyanaga T., Watanabe T., Fujinaga Y., Inoue K., Sunagawa H., Fujii N.,
RA Oguma K.;
RT "Characterization of nontoxic-nonhemagglutinin component of the two
types of progenitor toxin (M and L) produced by Clostridium botulinum
type D CH-16."
RL Microbiol. Immunol. 39:457-465(1998).
DR EMBL; AB012112; BAA75082.1; -.
DR EMBL; AB012111; BAA75077.1; -.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 6.
DR SMART; SM00458; RICIN_2.
DR PROSITE; PS50231; RICIN B LECTIN; 2.
SQ SEQUENCE 291 AA; 34226 MW; EFE7E23C9F9C2F3B CRC64;

Q9ZWV4 Length: 291 September 1, 2004 07:07 Type: P Check: 1195 ..
Found using 'seq23' (hayes346.key)

...

47 SGANQKWLIIYDTNKQAYKIKVMDNTSLILTNAPLSSVSVKTDITNGDNGYVLLQWYIS
97 100107 RNVIIRYNNPNVLQVNIIDDTLMVSTQTSSSNQPFKFSNCIYEALNNRNCKLQTLNSD
149167 RFLSKNLNSQIIIVLQWQFDSRSRQKWIIEYNETKSAYTLKQENNRVLTWQNSNNYVETY
212


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227  OSTDSLQIWNINYLNDASKVILNLQNTNRVLVDYNSQIANGTHVIVDSYHGNTNQOM
      235      248
      1--| 1--|
287  IINLI
-----
9 matches found in sequence:
q9zwv5 ; ORF-22.
(from "bt_spt.pep")
TOIG of: q9zwv5 check: 6358 from: 1 to: 179
ID Q9ZWV5 PRELIMINARY; PRT; 179 AA.
AC Q9ZWV5;
DT 01-MAY-1999 (TReMBLrel. 10, Created)
DT 01-MAY-1999 (TReMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE ORF-22.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1873;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
RL botulinum type D strain, 1873.";
DR EMBL; AB012112; BAA75074.1; -
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; F:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR00395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR PRODOM; PD001963; Bontotoxylisin; 1.
DR PRODOM; PD001963; Bontotoxylisin; 1.
SQ SEQUENCE 1196 AA; 138670 MW; C3716F6A270AFA95 CRC64;
Q9ZX77 Length: 1196 September 1, 2004 07:07 Type: P Check: 1583
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNFSQDSERENFLQAIILLKRINNTISGKQLLSLTAIPPPYGYGGYSS
      110
120 PNIFFGKTPSKNKLNSLVSTIPFPGGYRETNVIESQNNKNFYASNIVIFGPGSNIV
      110
180 ENNVYKKNDANGMGTMAEIVFQPLLTYKYNKFVIDPAMELTCLIKSLYFLYGIKPS
      211
240 DNLVFPRLRTELDNKKFSQLNIIDLLISGGVDLFINTPNYWFNTSNYPNSIKMPEKYZ
      298
300 NIYKTEIEGNNAGNDIKLRKQKQINVDIWNLNLYFCQSFNSIIPDRFSNALKHFY
      301
360 RKQYXTMDYTDYNINGFVNGQINTKPLSNKNTNIISKPEKVNVLNENNISLMKSNY
      363
420 GDGLKGSTEDFYSTYKIPYNEEYERFNDSDNPPPLNNISIEVDSIPEIIDINPYKQNSD
      431
480 NLVFTQITSMTEVTHHTALSINYLQAIQNTNNENFTLSSDFSKVSSKDKSLVYSLDNL
      503
540 MSYLETIKNDGPDITDKKYVLMKVEVFNYSFDINLTQBIIDSMCGINEVVLWFGKALNIL
      558
      559
600 NTSNSFVEEYQDSGAISLISKDKNLREPNIEIDISDLSLLGLSKDLNNKKNLYEYTSKNIV
      651
```

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227  OSTDSLQIWNINYLNDASKVILNLQNTNRVLVDYNSQIANGTHVIVDSYHGNTNQOM
      235      248
      1--| 1--|
287  IINLI
-----
9 matches found in sequence:
q9zwv5 ; ORF-22.
(from "bt_spt.pep")
TOIG of: q9zwv5 check: 6358 from: 1 to: 179
ID Q9ZWV5 PRELIMINARY; PRT; 179 AA.
AC Q9ZWV5;
DT 01-MAY-1999 (TReMBLrel. 10, Created)
DT 01-MAY-1999 (TReMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE ORF-22.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1873, and CB16;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
RL botulinum type D strain, 1873.";
DR EMBL; AB012112; BAA75074.1; -
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; F:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR00395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR PRODOM; PD001963; Bontotoxylisin; 1.
DR PRODOM; PD001963; Bontotoxylisin; 1.
SQ SEQUENCE 179 AA; 22032 MW; 97B1A9D6BA48DBA6 CRC64;
Q9ZWV5 Length: 179 September 1, 2004 07:07 Type: P Check: 6358
Found using 'seq23' (hayes346.key)
...
61 MNDLFYAIBNLKDHQNFIEMLSKKYEKTSKYNLYDYNDILYHLWKELEINLK
      36 39 43 46 51
      39 42
      40 43
61 NFNSBLDKYISTSIKRYCINICKKKNRDKKIYNSEVYTKLDAVNVYSLYCDNFEL
      101
121 DLISILNYKEQIIYKFFEGRKDNIEAIRLRLRSQSIYKIRIKSLKLYPIVMQLVNI
      135
24 matches found in sequence:
q9zx77 ; NTNH.
(from "bt_spt.pep")
TOIG of: q9zx77 check: 1583 from: 1 to: 1196
ID Q9ZX77 PRELIMINARY; PRT; 1196 AA.
AC Q9ZX77;
DT 01-MAY-1999 (TReMBLrel. 10, Created)
```

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660 YFKKIYPSFLDQWTEYYSQYFELICWAKQSILAQESLVKQIVQNKFTDLSKASIPDPDL
    665          |---| |---| |---|
    677          |---| |---| |---|
    680          |---| |---| |---|
720 KLIRETTEKTFIDLNSBSQISMNRVDNFKASICVFVEDIYPKFISYMEKYINNINIKT
    761          |---| |---| |---|
780 REFIQRCNTNDEKESILINSYFTKTDIFKFLDIQSIKNFFNSQVQVQMKELISPYQLLL
    835          |---| |---| |---|
840 FASKGPNSEIIEDISGKNTLIQYTESIELVGVNGESLYLKSPNETIKF
...
914 DDKTRLIGNKVNCGWEIYFEDNGLVFEIIDSNGNQBSVYLSNIINDNWWYISISVDRLK
    964          |---| |---| |---|
974 DQLLIFINDKNVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVDLNPITSEVIRNYF
    1032          |---| |---| |---|
1034 SYLDSNVIRDSKSLLEYKNYQLYNVVPFETSLYEVNDNKNKSLSKNTDGINISSVKF
    1035          |---| |---| |---|
    1055          |---| |---| |---|
    1058          |---| |---| |---|
1094 KLINIDESKGVQWDECIICVLDGTEKYLDIDISPENNRIQLVSSKONAKKITVNTDILFRP
    1122          |---| |---| |---|
1154 DCITFSYNDYFSLSLRSLDGYNNMICNDNNKVPKGAHLWILES
    1164          |---| |---| |---|
    1174          |---| |---| |---|
-----
4 matches found in sequence:
q9zx78 ; HA2.
(from "bt_spt.pep")
TOIG of: q9zx78 check: 8763 from: 1 to: 146

ID Q9ZX78 PRELIMINARY; PRT; 146 AA.
AC Q9ZX78;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA2.
GN HA2.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=1873;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
botulinum type D strain, 1873.";
RL Microbiol. Immunol. 42:599-605(1998).
DR EMBL; AB012112; BAA75081.1; -
DR GO; GO:0008903; Botulinum_HA-17.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SMART; SM00458; RICIN; 1.
SQ SEQUENCE 146 AA; 16672 MW; B86315B974DFR3FD CRC64;

Q9ZX78 Length: 146 September 1, 2004 07:07 Type: P Check: 8763 ..

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Found using 'seq23' (hayes346.key)
1 MSSERTPLPKNYKIKSLFSDSLYLTYSGALSPPTSSLDNQKWKLEYISSSSNGFRFSN
    24 27          |---| |---| |---|
61 VAENKYLAYNDYGFYIYSSSSNNLSLNPILKIALNSYIICTLSIVNVTDYAWTIYDNNNN
    67 70 73 76          |---| |---| |---|
    70 73          |---| |---| |---|
121 ITDQPI
...
-----
19 matches found in sequence:
q9zx79 ; HA3.
(from "bt_spt.pep")
TOIG of: q9zx79 check: 5189 from: 1 to: 623

ID Q9ZX79 PRELIMINARY; PRT; 623 AA.
AC Q9ZX79;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA3.
GN HA3.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=CB16;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
botulinum type D strain, 1873.";
RL Microbiol. Immunol. 42:599-605(1998).
DR EMBL; AB012111; BAA75075.1; -
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTERTOXN.
SQ SEQUENCE 623 AA; 70564 MW; 8524F8AF54780669 CRC64;

Q9ZX79 Length: 623 September 1, 2004 07:07 Type: P Check: 5189 ..
Found using 'seq23' (hayes346.key)
...
20 NLADGVVNRGSGWILSRQNLGNNISNGCTAIVGDLIRRETATPYPTASFNEEY
    70 73          |---| |---| |---|
    70 73          |---| |---| |---|
80 IKNVQNVFANFTEASEIPIGFESKTAPEKSNKSLMYLQYIRYRIEIKVLQNTVTEAAV
    114 119 124          |---| |---| |---|
    114 119 124          |---| |---| |---|

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116 121
140  LYVPSLGYYKSI EPNSEEQIDKNFYFTSQDKCILNEKFIYKKIDDTITVKESKNSNNIN
179
200  FNTSQITLPPNGLYVINKGDGYMRINDKDLICLLLESSTSGSIIQPLRNTTREL PNT
269
260  SNPTIFSQYTEARLNDAFNIQLENTSTTLFKFVEEAPTNNKISMKVNTYKYELIN YQ
307 313
310
320  NGNIDDKAEYLLPSLGKCEVSDAPSPQAPVETFDVQDGFIOGTGNENIIVGVINPSENI
380  EEISTPIPDYTVNIPTSIQNNACVYLFKVNVTGTVYKITTNNLPLLIYEALGSSNRNM
404
440  NNNLSNDNIKAICYITGLNRSDAKSYLIVSLFKDKKNYYIRIPQISSSTTSQLIFKREL G
466 478
500  NISDLADSTVNILDNLNTSGTHYTRQSPDVGNVYISYQLTIPGDFNNIASSIFSFRTRNN
533
560  QGIGTIYRLTESINGYNLITINNYSDDLNNVEPISLLNGATYIFRVKVTGLNNYNIIFDA
575 583
613
620  YRNS

-- Search Statistics --
Times:      CPU      Total Elapsed
           00:00:00.03      00:00:04.00

Number of sequences searched:      163
Number of sequence hits:          140
Number of separate matches:       1698
Number of sequence hits saved:      0
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